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EDITORIAL NOTES.

Influences of the British Commercial Gas Association.

THE second annual conference of the British Commercial Gas Association last week was no less successful than the first one. It was more so, as must have been apparent to critical observers the two days of the meeting. This second conference convinces us that evolution towards a higher state of industrial well-being is proceeding at a quicker rate than ever. The industry is in a well-organized condition; but there is a movement now (indefinite it may be at the moment, but certain it is that at some time or other it will come about) to further solidify, and so strengthen, the forces of the industry. The organizations that are already in existence have, by combination, it is no exaggeration to say, done marvellous things in bringing the industry well into the public eye. The work is seen in the ramifications of the labours of the British Commercial Gas Association, which are not all on the surface as represented by the advertisement columns of the daily newspapers; it is seen in the National Gas Exhibition; it is seen in the cordial approval that is being given to the operations of the industry by many learned and public bodies, which approval has been crowned by the support, influence, and assistance that have been twice recently rendered by the Lord Mayor of London; it is seen in the general recognition that the course shaped for the gas industry is bringing about—gradually, it is true, but surely—more salubrious conditions, improved conveniences, and greater economy for the whole of the community. What better state can the industry ask; and this is being accomplished by organization. He who cannot see this must be blind to the plainest of facts. What the British gas industry is doing in driving its commercial interests forward is attracting attention even beyond our own shores, as was testified last week by the number of visitors from abroad who attended the conferences.

Of more immediate importance to us, however, is the fact that many gas undertakings the managements of which originally held back, dubious as to the influence that the Association would wield, are now numbered in the membership. In his pithy Presidential Address, Mr. Edward Allen last Tuesday made the gratifying announcement that no less than 77 per cent. of the capital of the gas industry is to-day represented in the ranks of the organization. Those managements hesitating at first, but keen, penetrative, and appreciative, see and admit the results of the work. They see the wave of recognition rolling over the country; they see the new life that is ruling in the industry; they see business, once threatened in some areas with stagnation, being built up on fresh lines; they see the awakening as to the uses of gas among the population and in industry. The work is worth paying for. This is not a poor industry of ours; it is an industry that can force its way—by sheer persistence in making itself known and its utility acknowledged—to a vast business expansion. This is all being done. It is being done well; and on an administrative expenditure, as Mr. F. W. Goodenough was saying last week, of not more than 5 per cent. of the revenue. We congratulate, and that most heartily, those who labour, whether in honorary capacity or otherwise, on what is being accomplished. They are reformers of the first order.

Who at one time ever thought the day would come when the manufacturers of gas plant and appliances would do anything more in the way of assisting in the development of the gas industry than by advertising their own special wares? In our wildest dreams such a state of affairs was never suggested; but what has brought about the change? The educational force of organization, and the opportunity thus afforded for conference. The manufacturers are an integral part of a great industry. They recognize that with the prosperity of the gas-supply industry their own prosperity is bound up. They realize that stagnation in the industry means stagnation for them; they realize that the industry's development means their own well-being. It is essentially a co-operative industry—an industry in which the components share and share alike; and therefore an industry in which the force of co-operation must be brought to bear in working to a progressive fulness. Who among us at one time thought it possible to bring out the municipal gas administrations and boards of directors to take a personal interest, and active and financial part, in organized work aiming at industrial expansion? There, again, in our wildest dreams, such a thing at one time did not occur to us, though time has passed by some years since it was advocated in these columns that an effort should be made to bring them into co-operative rank. It is an accomplished fact to-day. In the public interests, local and general, the chiefs among local rulers recognize that the expansion of the gas industry is a good thing. They and their boards of directors appreciate that it is by expansion that the industry's future is assured; and they appreciate, too, that the position in which they have been placed is one of public trust, and that confided to their administration is a service that is highly beneficial to the whole community.

The influences of organization, conference, and literature are—testifying to this were last week's meetings—bringing forth their fruit among the administrators. They are all becoming as keen as their executive officers in raising to maximum efficiency the operative forces in their own individual concerns, in order to realize the highest service. Let the discussions on the papers by Mrs. Cloudesley Brereton, Mr. Oscar Fogg, of New York (who was heartily welcomed, and who told of the progress of the commercial gas organization in the States), and Mr. Thomas Waddom be examined; and it will be readily observed how acute is the interest that is being taken, by the administrators of our gas undertakings, in suppressing the past methods and low order of intelligence that obtained in the outdoor business staff, and substituting methods applicable to to-day and trained men—trained not only technically in gas use and appliances, but in those other qualities that go to make for efficiency in salesmanship. The gas industry offers scope; it demands a higher order of salesmanship than heretofore; and it is the business of every undertaking to provide the means for obtaining what is required. The administrators themselves are seeing the necessity of opening wide the back door, and pushing out ancient custom, and unlocking the front door to the new order of things that contemporary conditions claim, if the industry is to grasp, and advantage by, the potential circumstances that lie so clearly at hand. There is much work to be done; and it has to be done by brains. By no other means is it possible to achieve all that there is to be achieved. Verily, if all the practicable advice that was tendered at the meeting last week is adopted, we shall have gas sales departments, methods, and men upon which and upon whom can be affixed the label *Ne plus ultra*.

Attaining that pitch of perfection in men and sales methods does not comprise all that has to be done. The chief lesson of Mrs. Cloudesley Brereton's paper is that the gas industry must get more into the homes of the people to ascertain wants, and to educate in the proper use of gas appliances. In America, Mr. Fogg tells us (in the course of his reply to the discussion on his paper), they have been, for instance, investigating the troubles of servants in connection with the use of gas appliances; and they are utterly ashamed of themselves for having so long neglected this aspect of their work, for they find all grievances are subject to correction. The lessons that have been learned in this direction are exceedingly valuable. This is a matter that requires attention everywhere. Mr. Waddom says they have at Newcastle specially trained men to attend to complaints; Mr. Goodenough mentions how, in the area of the

Gaslight and Coke Company, inquiries are made as to whether every piece of new apparatus fixed is working properly. Mr. George Stevenson, of Long Eaton, reminds us, however, that there is a large class of consumers who go on year after year and do not complain, though faced with some small difficulty that is not understood; and in these cases he finds the lady inspector and adviser who go to the consumer, and do not wait to be asked to go, most valuable. That is one of the lessons of this last conference. It brings home to us more than ever the vast amount of work that there is to be done behind the doors of the dwellings of the people; and therein we have a greater meaning and value attached to the two words "Good Service." A still more intimate knowledge of what is required is being engendered by conference through organization. The gas administrators who attend these conferences, are having inculcated in their minds a new order of duty; and this duty, it is evident, is becoming part of their administrative creed. To help them in it all the Association, when their finances will allow, are contemplating the appointment of an advisory expert on the scientific side.

The Association are to be heartily congratulated on the general position resulting from their work. Its worth cannot be estimated. The results we have alluded to cannot be assessed in terms of pounds, shillings, and pence. These results (to say nothing of public education and extending interest) are placing the work of the gas industry on a plane that it has never before occupied.

The Water Heating and Industrial Businesses.

THERE were two papers read at the conference of the Association last week which should have excellent influence on the future work of the industry. The one was by Mr. A. E. Broadberry, of Tottenham, on "Hot Water Supply as a "Field for Increased Sales," and the second was by Mr. H. M. Thornton, on the "Development of the Use of Gas "for Industrial Purposes." We would suggest that copies of these two valuable papers should be placed in the hands of every gas man connected with the sales department of every gas undertaking. The conversion of the heating methods of homes from the crude use of coal to the scientific and healthy method of employing the radiant heat of gas-fires, which Dr. Leonard Hill assures us is the nearest approach to heating by the action of the sun's rays, is well on the high road to an extended adoption; the gas cooking-stove has gained its place as a simple, expeditious, and reliable method of meeting the requirements of households, hotels, cafés, business establishments, and large institutions of all kinds. There also is water heating—the last barrier in the defence for the retention of the coal-consuming, dirt-producing, and air-polluting kitchener.

Mr. Broadberry is convinced that, now that we have reliable means of heating water by gas, the doom of the use of coal in the kitchen is sealed. There is no excuse for its continuance; there is every reason for its total abolition. As gas-heated water appliances become better known, the rate of their application will be hastened. But it must be by the hiring and maintenance methods that apply so successfully in other of the gas industry's lines of business. This is very essential. The figures given in the paper proclaim the initial success in the Tottenham Company's area; and as experience extends, so will be adoption. In developing new business, it is always the beginnings that are most troublesome; and in regard to these beginnings, from what we have heard in relation to certain gas-supply areas, there should be, especially in connection with water-circulating systems, men specially trained for this class of work—men who can judge, from the existing order of things, the lines of application that will produce success right away from the initial stage. At the conference, Mr. W. J. Sandeman, of Croydon, particularly impressed this point; for he has found, by experience, that the statement of representatives of some makers of gas-heated water-circulators, that it is only necessary to connect them by a T-piece to existing house systems, is far from the truth. Experience is the best protector in relation to future action; and such representation, after adverse experience, will naturally be treated in the manner that it deserves. However, on all hands, the gas industry is looking to the development of this line of business; and Mr. Broadberry's paper will be most helpful in connection with it.

Too high praise cannot be placed on Mr. Thornton's paper on the industrial uses of gas. It compels attention by its unusual character; it will stimulate inquiry by the very expanse of the illustration of typical applications of gas in industry that it presents. The illustrations have been gathered at infinite trouble by the author, and with an express disinterestedness in the matter of appliances, as is exemplified by the range of goods of different makers pictured in actual operation. The paper is by no means merely a descriptive catalogue of industrial gas appliances. It is an account of actual work; and our regret is that we can only reprint probably less than a quarter of the total of the illustrative work. Nothing of the kind has ever been produced before; and Mr. Thornton therefore deserves warm thanks for his original investigation, and for the results of which he gives simply a digest. We have said the paper is stimulating. It is also a revelation; for until one is confronted by what amounts, as this does, to a report on the general subject, those working outside purely industrial areas have but a very vague notion of how largely gas has entered, and is entering, into the manufacturing life of this country. Mr. Charles Carpenter, D.Sc., and Mr. Henry E. Jones at the luncheon on Thursday incidentally referred to this industrial development of gas use; but what they said—well, was small in comparison with what is contained in this paper. Some gas-supply areas are purely industrial; but most gas-supply areas—even the so-called residential ones—have industrial work carried on in them that demands heat for some purpose or other. Of course, all gas undertakings cannot hope to get, from two industrial installations, a consumption of 200 million cubic feet per annum, as mentioned in his paper by Mr. Waddom. But most undertakings can enlarge their output by industrial use.

If there is one message more than another that every section of Mr. Thornton's paper conveys, it is to the gas salesman to get beyond the front door of every manufactory and every trading establishment in the area of supply of his undertaking, and to ascertain whether gas cannot be applied in every one of them for some heating process. It is a good thing to make a register of every factory in an area, institute inquiries, learn the nature of the work carried on, and get a trial installation made. The more Mr. Thornton has investigated this question for the purpose of his paper, the more astonished he has been at the uses of gas in industry, of some of which uses he had never heard before; and he has therefore come to the conclusion that the possibilities in this direction are immeasurable. The full paper must be read; and after an engineer has read it, certain we are that he will require copies for distribution among his outdoor staff.

Federating the Industry's Forces.

THESE are the days of a broadening democracy; these are the days of co-operation; these are the days of co-partnership in the gas industry; these are the days of joint-stock enterprise in business generally; and these are the days, in every walk of life, in which union means effective strength. There is union everywhere. Therefore, it did not come as a surprise to hear the announcement that the President of the Institution of Gas Engineers and of the British Commercial Gas Association (Mr. Edward Allen, M.Inst.C.E.) made at the annual dinner of the latter organization last Tuesday evening. He said: "There is a scheme in the air "for federating the three gas organizations, so that the great "gas industry may stand before the world a single, united "body. Should this be accomplished, the industry would "become strong for attack and defence. 'The three-fold "'cord, who shall break it?' May I say that the proposed "federation would not weaken, but would strengthen, our "organizations. The Institution would raise its status as a "professional body; the Society of British Gas Industries "as a commercial body; and the Association, as represent-"ing both bodies, would gain influence in ministering to the "wants of the public." The movement that, as the President puts it, is "in the air," is quite in accord with the natural order of things, and with the spirit of the times; and, if consummated, it will be the fulfilment of a condition of things that has for long past been advocated in the "JOURNAL," despite a certain amount of opposition that is now dying away in the presence of unfolded experience. Opposition notwithstanding, we have tenaciously clung to the deep conviction that a fully developed industrial organization is the correct thing for the gas industry; and to-day there is seen in the history of organized work in the industry, nothing but confirmation. It is true that, when the British

Commercial Gas Association was founded, and helped to fill the yawning gap that was seen in the organization of the industry through the previous exclusion of the administrative and financial element, we then gave support to those who advised that, for a brief space, the matter of a complete central organization should remain in abeyance. It has remained in abeyance now for some two years; and what is the result? To-day, everything points more strongly than ever to the ripeness of the industry for the assembling and bonding of its organized parts, and to this being a most politic action.

May a reference be made to the past, and to what has eventuated, without laying ourselves open to the charge of egotism? It is only human nature to like to have some, at any rate, share of credit for any part taken in initiating a good thing, or a policy that has proved to be the right one. That share of credit seems to be consistently denied to us—possibly because the lapse of time sometimes has the effect of blotting actual facts from memory. Looking back to the days when division existed in the British gas profession, and to what happened in removing the obstacle that existed to a reunion, the early years of the last decade saw the manufacturers of gas plant and appliances without any part in the organization or organized work of the industry; yet their portion in the industry was, as now, one of material importance. As Mr. R. G. Shadbolt said in the Guildhall of the City of London last Tuesday evening, the condition of the manufacturers at that time was one of chaos. Then came the Earl's Court Exhibition of 1904; and during that memorable event, an article appeared in the "JOURNAL" columns (an article inspired by no one outside this office) which suggested the formation of an Association consisting solely of the principals of the firms making and supplying the plant and appliances that the gas industry requires—many of which principals are of high technical standing and special knowledge—and wholly excluding from the proposed organization the employees of the manufacturers whose only legitimate avocation is to increase the volume of their employers' business. Between the principals and their commercial assistants, a vast difference was seen; and the inclusion of the one and the exclusion of the other it was believed would add to the dignity and respect of the contemplated organization. Ours was only the suggestion; that is all for which we claim any credit. The work of founding the organization was the harder part; and those men whom Mr. Shadbolt mentioned, as well as others whom we call to mind, deserve the fullest credit for accomplishing this more difficult part.

Looking back, confident are we that what happened at the time of the reunion of the gas profession was, in the result, the best possible thing for the industry that could have occurred. Had it not been for that happening, and for the position of the manufacturers as nothing more than floating units in the gas industry, without any means of proper approach or helping in the work of furthering the interests of the industry, it would never have occurred to us, nor possibly to anyone else, to suggest their union. The Society of British Gas Industries has waxed in strength. From its membership have been excluded all who are not principals of firms or responsible managers. It has proved its power for good in the nine years of its existence; and, among the manufacturers themselves, a new life and a new spirit have spread and flourished solely through the instrumentality of the Society. It is deliberately said, and without fear of contradiction, that the industry to-day, in the matters of powerful organization and resource, would not have been what it is had it not been for the existence of the Society. The contrary view is invited without fear of its being forthcoming. We come to the further development. In these columns there appeared the original suggestion as to the broadening of the base of the Institution of Gas Engineers, before Mr. James W. Helps gave, a few years since, the greater prominence that was needed to the matter in his Presidential Address to that body. Mr. F. W. Goodenough outlined his advertising scheme in 1907 in the paper he then read before the Institution. This paper planted the seed from which sprung the British Commercial Gas Association. But again we endorse, and it is not open to denial, the claim that Mr. Shadbolt made the other night that, had it not been for the existence of the Society of British Gas Industries, the Association would not have gained the eminence, the respect, and the assistance that it has done in rendering it the most potent force that has yet been witnessed in the work of the gas industry. Look at what has been done; look at the influences which are traced in another editorial article; and the next step in the development of organization is plain.

This next step is the one which Mr. Allen announced on Tuesday as being a current movement and possible development. The past decade's history of the industry points to this as the natural climax; it is the only way that we can see of putting the coping-stone on the industry's organization. The interest of the industry towers above, and looks down upon any feeble talk of sectional supremacy; and those who have the highest interests of the industry at heart, and are capable of intelligently profiting by the lessons of the industry's recent developments, want to hear no more of such talk of supremacy. Oneness is the imperative order of the day; and oneness there must be if the best is to be done for the industry, by recognizing the co-partnership of all interests. The three organizations, it is true, have, in a measure, distinctive aims; and yet is there one of those organizations as now in existence which has not a very close interest in what the other is doing? Apart from aims and objects, and the influence of the work of any one of the organizations upon the work of the others, of two of those organizations there is only one the members of which are direct pecuniary contributors to the work of the third. But the members of the non-contributing organization have influence in procuring the other part of the finances for conducting the work of the third one. The conditions and necessities thus point unerringly to consolidation, and this consolidation is to be obtained by federation. But it must be, as it will be, federation in which all interests will have their proper representation. And we have not the slightest doubt that this principle will be recognized and observed by all parties from the very outset. We imagine it means the formation of a central organization, on the controlling Council of which will be represented the Councils of the three organizations. The three organizations, we take it, will continue to pursue their individual work, and will hold their sectional meetings. From our point of view, it would be something to be deplored if the good influences of the meetings as now held were in any wise subordinated by any general consolidation scheme. For instance, gas undertakings in increasing numbers are now developing sales departments, with a specialized head. These heads of the sales departments are being drawn to the conferences of the Commercial Gas Association; and at the last annual meeting of the Association, the discussions brought out certain of these responsible sales chiefs. It also brought out expressions of opinion from several administrators. All these—and their number will grow—have never, under the old order of things, had a platform upon which to give the industry the benefit of their views; and it would be the height of folly to submerge them in meetings of a large central organization, at which they might be inclined to take a back seat. They are to be encouraged to come out. On the protection of their platform, and the encouragement of their interests, rests the chief consideration that will make for the stability of the central organization.

There will be interest in awaiting the signs of definite development of this consolidation proposal; for it is fraught with the utmost importance for the gas industry. To bond together the three separate organizations, and yet not disturb their individuality in purpose and effect, is the work that lies at hand; and we hope that an acceptable scheme will be produced. If one is, then it will mark the centenary of public gas supply and the jubilee of the gas profession's central organization in a manner that will open a new era in common work for our industrial progress.

Somerset and Gloucester Gas Company.

Sir George Kekewich we know; Mr. F. C. Murray, M.Inst.C.E., sounds all right; as to who Mr. T. W. Vaughan, "Gas Engineer," of 22, Cross Street, N., is our knowledge is at fault; and with Mr. Frederick Colman, we have no acquaintance, though he is Secretary of the United Gas-Works Development Company—a concern of which we know absolutely nothing, but we hope to learn more if the first of their efforts, with which we have come into contact represents the type of promotion that they are out to develop. The names above represent the Directors mentioned on the front page of the prospectus of a concern submitted to the public under the magnificent title of the Somerset and Gloucester Gaslight and Coke Company, Limited, with a capital of £20,000, divided into 2000 seven (!) per cent. cumulative preference shares and 2000

ordinary shares. The vendors promised to pay interest on the preference shares for the first year, and a dividend of eight per cent. on the ordinary shares, which was exceedingly kind on their part. A report on the scheme was made by Mr. F. G. Jones, Assoc.M.Inst.M.E. Whether this particular Mr. Jones has any technical qualifications in connection with gas supply is not known to us. There would perhaps have been ground for some amount of confidence in the scheme (had another important fact not come to notice) if a gas engineer of recognized position had reported upon it.

The Scheme and its Meaning.

The report of the above-mentioned Mr. Jones was based on an annual consumption of 40 million cubic feet of gas; but the estimate of profit was made out on a sale of 20 millions, at the price of 4s. 10d. per 1000 cubic feet! The statement was made that over 1000 persons had signed preliminary contracts for gas. The 20 million consumption with 1000 consumers in the rural area proposed for the scheme would have averaged 20,000 cubic feet per consumer, which, at 4s. 10d. per 1000 cubic feet, would have meant a revenue of nearly £5 per consumer per annum; and as a large number of the consumers were expected to be of the prepayment class, the estimate for a rural district did not look very sound. But on the 20 million cubic feet, it was expected that a profit of £2524 16s. 8d. would be made, which would allow of a dividend of 7 per cent. on the preference shares and 12 per cent. on the ordinary shares, so that out of the price charged to the consumers on this estimate the promoters proposed that the capital charge should be 1s. 10·8d. per 1000 cubic feet. A heavy charge that! If the business reached 20 million cubic feet, and the capital was all subscribed, it would have represented the tall capital figure of £1000 per million cubic feet, and more if the business did not reach the estimate. We cannot regard the proposed scheme as financially sound.

The Dénouement.

Little good, however, would be served by further criticizing the prospectus, seeing that the scheme has collapsed owing to the intervention of the Bristol Gas Company. The area proposed in the scheme included Northstoke, and the parishes of Kelston, Swinford, Bitton, Upper Cheyney, Beach, Willsbridge, Longwell Green, Cadbury Heath, Oldland, Oldland Common, and Bridge-Yate—partly in Somersetshire and partly in Gloucestershire. From a letter received from Mr. John Phillips, the Secretary of the Bristol Gas Company, all this district, with the exception of Kelston, is included in the area of supply of the Bristol Gas Company; and a notice that the latter would apply for an injunction if there was any encroachment on their limits, brought the promoters of the new scheme to a dead-stop. Meanwhile, a shareholder, learning of the threatened injunction, wrote to the Secretary and Directors of the Company, pointing out that in the circumstances the prospectus had suppressed material facts, and contained misrepresentation of the position; and he therefore demanded the return of his money within twenty-four hours, or, without further notice, he would take such legal action as was open to him to secure redress. Both Sir George Kekewich and the Secretary of the Company replied that the whole of the money subscribed would be returned within fourteen days to the subscribers, in consequence of the action of the Bristol Company. Someone had blundered; but perhaps this *dénouement* was the best thing that could have happened; for with such a scattered district, and such a load of capital for the business to be done, there would, we fancy, have been serious troubles ahead. The United Gas-Works Development Company, if they propose going in for any more gas schemes had better submit them to a gas engineer well known to the industry, before applying to the public for money. Otherwise there may be unpleasantness.

The Railway Commission.

The proceedings of the Railway Commission that has been appointed to consider the relations between the railways and the State will have interest for the gas industry. Gas undertakings, with other manufacturers, have had cause for a great deal of complaint regarding the conveyance by the railways of raw materials and goods generally; and anything that will produce improvement will be heartily welcomed. The terms of the reference have been made purposely wide, owing to the fact that, as the President of the Board of Trade (Mr. Sydney Buxton) says, there appears to be increasing friction between the railways and the traders of the country; and only by way of a Royal Commission is it at all possible to obtain necessary and complete information for grappling with the problem. Generally, what Earl Loreburn and his colleagues have to consider is: (1) To what extent, and in what way, steps should be taken to improve the relations between the railways and the community. (2) How far they should be based on a different foundation. (3) Whether the State should itself undertake the responsibility of management. The task is not a light one; but if something beneficial results, so much the better for everybody.

Mists and Gas.

The fogs of the past few days in London have been of the aqueous vapour kind; and, though very disagreeable, they have not enveloped us with the thick yellow and black atmospheric pall which formerly was so much in unwelcomed evidence, and which was brought to that condition by the products of coal combustion. Every coal-consuming stove that is supplanted by a gas stove or fire reduces the contribution to an unhealthy atmospheric condition; and London has done a great deal to suppress the thick fogs by the application of gaseous heating. From what we hear, the National Gas Exhibition and recent dreary days produced by rains, mists, and low temperature have set the ball again rolling in the matter of orders for gas-fires; and there are some gas undertakings that are crying out for more fitters to enable them to cope with the order forms that have grown in number beyond the ability of the fittings staff to deal with *pari passu* with receipt.

The Only Remedy.

The "Pall Mall Gazette" regards cheap gas as the only remedy for preventing thick fogs; and it quotes the following opinion of an "authority:" "If gas were greatly cheapened, as it might be, by producing it at the pit-head, and conveying it by pipe to the consuming centres, instead of distributing the coal for the purpose all over the country at great expense, domestic cooking and heating by gas would become general; and then, with a stricter application of the law in regard to the factory smoke nuisance, we might look for the final defeat of the fog fiend." It is the old notion. Advocates of pit-head gas manufacture always fail to look at the other side of the picture. What is gained in reducing the quantity of coal to be conveyed would be lost on the capital cost and maintenance of the immense distribution systems that would have to be laid down, and laid down through so much of that uncultivated land that the Right Hon. Lloyd George picturesquely describes as being "in Chancery." There would also be the coke and other secondary products to distribute about the country, combined with the difficulties and dangers associated with long-distance transmission of the gas. There will ever be pit-head gas-making advocates; but the community has better service and more certainty under present conditions. Meantime, the gas industry, in its own way, and according to the dictates of the times, works towards lower gas prices. If the colliery owners had not been so grasping last contract season, there would this year, we confidently believe, have been a very general lowering of the price of gas.

The Gas Industry in Germany.—A recent number of the "Bayerisches Industrie- und Gewerbeblatt" contained an article on the German gas industry, in the course of which it spoke of the service done to the public by the keen rivalry of gas and electricity in the past few years, which had caused each to put forth its best. It spoke of high-pressure lighting, slot meters, and the erection of bath-rooms common to several families—the newest departure being slot installations which enable 20 lbs. of washing to be performed with 1 cubic metre (35 cubic feet) of gas. But in spite of all this, continues the writer, the German gas consumption remains far behind the English. Prices stay high, and some works have even raised their prices in the last few years, though a few have made reductions and introduced uniform rates for cooking and heating. Considerable financial difficulties stand in the way of a reduction to English bases, as in most cases the gas-works are an indispensable source of income to municipalities. A few years ago many municipalities were buying up private concerns; but now the reverse often happens—as for instance the agreement of the town of Rheydt with the German Continental Gas Company for the supply of gas and electricity.

BRITISH COMMERCIAL GAS ASSOCIATION.

SECOND ANNUAL CONFERENCE { CITY OF LONDON GUILDHALL, OCTOBER 21, 1913.
NATIONAL GAS EXHIBITION, OCTOBER 22, 1913.

EDWARD ALLEN, Esq., M.Inst.C.E., President.

EDWARD ALLEN, President of the British Commercial Gas Association.

NOTES FROM THE CONFERENCE.

It was a wet morning on Tuesday; and London did not look at its best. But the luxuriant means of conveyance about the Metropolis come in very handily on such days. They had good patronage by the members of the British Commercial Gas Association in reaching the beautiful and ancient Guildhall of the City of London, which, for the first day's sittings of the second annual conference, and the annual dinner, the Lord Mayor (Sir David Burnett, Bart.) had, in the goodness of his heart, placed at the disposal of the members. It was a recognition of the gas industry, and of the national importance of the Association, which the members highly appreciated, and more especially as, on this occasion—owing to the National Gas Exhibition, and International Day on Thursday—there was a large number of visitors from abroad, who were invited and welcomed most heartily to be present at the proceedings of the Association and the concomitant entertainment. There were happy greetings on all hands. In the vestibule men from all quarters of the British Isles were met, and faces from abroad that are, through international courtesy in the gas industry, as familiar as those of some men whose work is cast in the homeland. Such meetings as these help one to feel our industrial strength. All are bent on the same work —the advancement of the gas industry. The welcome to the Guildhall, the home of the highest civic life in the world, was testimony to the fact that, through the new life and the new work in the gas industry—life and work largely due to the British Commercial Gas Association—the industry has attained a recognized place in the very first rank of industrial enterprise, and of enterprise that contributes to the service of the country, and to the elevation of the conveniences and economies of the community. The men of the industry paced the historic hall hallowed by the memories of Kings, Queens, princes, heroes, and princes of science, of imperial and local government, and of commerce, and which hall also holds high place in the affections of the nation as a centre where are maintained in the present day the cherished traditions and dignity of British civic life—maintained in such a way that no one, however highly placed, deems it anything but an honour to receive recognition from the Lord Mayor and the Corporation within the walls of the City Guildhall.

In the Council Chamber.

The Council Chamber is no ordinary Council Chamber. It seems to have been gracefully set as a gem in the centre of the historic pile. Within this beautiful piece of architectural and ornamental work, with its slightly ascending benches set in horse-shoe fashion, the members assembled. The place was packed as the hour of meeting approached. Company boards, local authority committees, gas engineers, men at the heads of sales departments, principals in the companies manufacturing the plant and the appliances needed by the gas industry were there in indiscriminate assembly. Our friends from abroad occupied seats side by side with their British *confrères;* some of them being afterwards invited to seats on the right wing of the däis, centrally placed on which is the seat of the Lord Mayor.

Observation was interrupted. "Gentlemen, the Right Honourable the Lord Mayor." The occupants of the filled seats rose. Sir David entered, accompanied by his retinue and the emblems of his high office. With him were the President of the Association (Mr. Edward Allen, M.Inst.C.E.) and Sir Corbet Woodall, the Chief of Metropolitan Gas Administrators, and the titular head of the gas industry. The Lord Mayor passed to his customary seat, with the President to his right side, and Mr. F. W. Goodenough; and to his left-hand side Sir Corbet Woodall, and Mr. Oscar H. Fogg, of the American Commercial Gas Association. Accompanying also were Mr. H. James Yates, Mr. H. M. Thornton, and Mr. W. D. Helps, the Chairman of the Council of the Society of British Gas Industries. Mr. John Young, the Junior Vice-President of the Institution of Gas Engineers, was there [Mr. John Bond, the Senior Vice-President, was unfortunately unable to be in London]; and the Hon. Secretary of the Institution (Mr. W. E. Price). Mrs. M. A. Cloudesley Brereton occupied a seat upon the platform, and later she was joined by Mrs. Allen. The indefatigable Mr. W. M. Mason, the Secretary, silently passed here, there, and everywhere. A message from the seaside that had been received from Mr. James W. Helps [though not read] informed us of the regret that he felt at his inability to be present at any of the functions.

Cheery was the greeting of the Lord Mayor; and he welcomed the Association's foreign guests in a manner that we had thought only possible for gracefulness on the part of Sir Corbet Woodall. His Lordship recognizes the importance of the industry; and of the great public work it is doing—leaving advantages and economy along every path that it takes. The President and Colonel Gascoyne, of Derby, voiced the gratitude of the members for the personal interest of his Lordship, and for the privileges conferred by him upon the Association.

After his Lordship had retired, Sir Corbet Woodall addressed to the Association a welcome in the name of the gas industry of London. The value of co-operation in the

industry is growing a strong point with Sir Corbet; and he finds a very emphatic expression of it in the National Gas Exhibition. The reference to the exhibition gave the President (Mr. Allen) an opportunity of saying how such an exhibition as the present one would have been impossible had it not been for the London Gas Companies. We who have been to an extent behind the scenes quite concur, and think that especial reference should be made to the Gaslight and Coke Company, whose big resources placed them in a special position for serving the industry. There was also acknowledgment from the President regarding the splendid manner in which the South Metropolitan Gas Company have kept up the end of the gas industry at the Ideal Home Exhibition.

Progress, and New Work.

It was a short address that the President delivered; but it was very much to the point. We were pithily told of progress; but one of the points of the greatest satisfaction to his hearers was supplied by the fact that there is to-day represented in the Association 77 per cent. of the capital employed in British gas undertakings. He referred to the good value given to the consumer by the industry's prime commodity in the way of B.Th.U's. for a penny. Such information as this conveyed in comparative form with other fuels, is what the intelligent householder would be all the better for having brought before him. How many consumers, too, are there who know that a single ton of coke contains the same heat units as a ton of coal within 3 per cent; and that this slight deficiency is balanced by more even and regular heating. The Association, as mentioned in an editorial article in the "JOURNAL" last week, have appointed a Coke Committee, which is working in conjunction with the London and Suburban Gas Companies' Coke Committee, and which it is hoped will prosecute a good campaign among the public in favour of coke. It is highly necessary; but, as the President says, the coke must be put upon the market in decent form.

The members punctuated the address with their approval of the points that were made, and especially the one where the President expressed the pious hope that the gas undertakings which were still wandering about outside the industry's co-operative force, would soon enrol themselves. There was recognition of the stimulating value of the address; the spokesmen for the members being Dr. Gray, of Hastings, and Alderman Dewhurst, of Accrington.

Apothegms.

The report and accounts were next submitted by Mr. Goodenough, the Chairman of the Executive. This gentleman is irrepressible; and he is far from satisfied yet. There are only two things that will make him give up his recruiting campaign, and they are that the membership of the Association is raised to 100 per cent. of the gas undertakings of the country, and that the Association's work is financed to the extent of £30,000 a year. When these things come to pass, then Mr. Goodenough will say less about such matters; certainly not before. He makes out a good case for the maximum effectiveness being given to the Association. There was applause when he mentioned the name of the South Metropolitan Gas Company as having come in to the Association. Mr. Goodenough is excellent at apothegms. A few were noted as his speech tripped out in moving the report and accounts. Here they are: "The Committee feel confident that, as with other habits, the habit of spending co-operatively will grow." Another: "I venture to say that, if the Association were to be closed-down to-morrow, every manager in the country would feel that his power in his district had sensibly diminished." Again: "Those undertakings which are most active locally are those that benefit most from the national campaign." Still further: "It is no use giving 2s. 6d. per million cubic feet to the British Commercial Gas Association, and then give your consumers only ill-informed advice, ill-mannered attention, and indifferent workmanship." "It would be better to keep your money to eke out your fading profits in the years to come, because they would be bound to fade." The wisdom of experience is in all these words. The report and accounts were unanimously adopted.

Liberty in Presidential Elections.

The President introduced certain changes in the rules, which hitherto have had the effect of confining tenancy of the Association's Presidential Chair to the Presidents of the Institution of Gas Engineers. The alterations bestow upon the members of the Association themselves the liberty of placing in their Presidential Chair men of their own choice, instead of having their Presidents found for them. Bailie Paxton, of Glasgow, a staunch supporter of the Association, will be the first President under the new order of things. The Association, we are sure, have done the correct thing.

Salesmanship.

It is sometimes a good thing to have one's work criticized and commented upon by an intelligent outsider, who has made a study of what one is doing. We undertake to say that Mrs. M. A. Cloudesley Brereton has never in her life sold a pennyworth of gas, and yet she, in the first paper that was read at the conference, writes fervently and with commonsense upon certain aspects of the gas salesman's work. The fact of the matter is that she, as a long-time student of social and economic problems, brings to bear upon her new work in connection with the Association, the lessons derived from that study. She believes that the more the gas salesman knows of the problems of domestic life and economy, the better equipped will he be for his post, and the greater efficiency and result he will show. Mrs. Brereton is quite right in that. A knowledge of how apparatus is constructed, of its efficiency, and of its proper fitting is absolutely essential; but if we also know our customers and the problems that they have to face, all the better. Different people, different habits and requirements. The salesman must know his people and their problems; and he must not apply the same methods to the different circumstances. Especially in such a business as gas supply, the more the salesman knows of the home and its needs, the more he knows of the problems of the woman; and the more he can meet her with appliances that can lighten the work of the home, the greater will be his results, and the greater the assurance of their permanence. The whole paper is an argument for taking a larger view of salesmanship, and for broadening the horizon of the salesman. Some definite recommendations are found towards the end of the paper, as to work that should be done in order to raise the salesman and his department to the highest point of efficiency. Earlier in the paper there was another definite recommendation, and it was that the salesman should be paid according to his worth.

There was considerable applause as Mrs. Brereton sat down. There was just time before the adjournment for luncheon for Mr. D. Milne Watson and Mr. Douglas Helps to respectively propose and second a vote of thanks to Mrs. Brereton; and this they did in the most graceful manner. After luncheon, there were not so many members in attendance as there had been throughout the morning sitting; but nevertheless there were various speakers who had something to say upon the suggestions in the paper. There was among others Alderman Phillips, of Salford. The men from Lancashire and Yorkshire are keen at picking up practical suggestions that will help them in their commercial life; and the Alderman did not miss, nor fail to appreciate the value of, the suggestion that the Committee of the Association should consider the appointment of a consulting expert on matters affecting the use of gas. Then we were reminded by Mr. R. W. Edwards of the paper that Mr. Goodenough read in 1907, and which was the original seed that had grown into the present Association, the advantages and possible ramifications of which cannot now be grasped. Some time since, Mr. Edwards favoured the appointment of a consulting expert by the Association; and he believes the time is ripe for it. He looks hopefully to a more efficient class of salesmen; and to a nearer approach day-by-day to our ideals regarding all these matters. It was a good point that Alderman Armitage made in saying that it is the shopkeeper rather than the shop that sends up business—thus giving support to the keynote of the paper. A comment on the discussion full of vigour came from the author, who is convinced that if the spirit of the first part of the paper is imbibed, it will be easy to carry out the practical second part. Every chief should have high ideals; and he should see that these ideals filter through to his very lowest subordinate.

What is Being Done in America.

Mr. Oscar Fogg—the "Goodenough" of New York City

—was suffering from the effects of a bad cold; and so his ever-ready compeer of London read for him the paper that he had prepared for the meeting. It gives a sketch of the work of the National Commercial Gas Association of America. This organization has had a much longer career than our own, but its progress along the road of active publicity work has not been of the same vigorous character. If, therefore, we were not first, we can claim to have got into effective operation quicker. Our American friends are, for instance, only just on the eve of launching out on a comprehensive advertising campaign; but from what we hear they are going to do it very thoroughly, as they have done the work that has hitherto been taken in hand. There, as here, before the Commercial Association was formed, no system prevailed in the publicity work of the industry. To-day in the States systematic educational work is regarded as an absolute *sine quâ non* to the development of the gas business. There is in the paper a suggestion for the manufacturers, and it is that they should adopt loose-sheet catalogues; and from more than one speaker in the discussion, the point was spoken to as being an advantage. The American Association has its bulletin, its leaflets and pamphlets, its photographs, its lantern slides, and its moving picture films; and it goes in very extensively for the collection of advertising matter. Another thing is the preparation of standard specifications for gas appliances. This is a point that would have been strongly criticized but for the fact that Mr. Fogg disarmed otherwise would-be critics with the observation: "It is perhaps unnecessary to remark that too much standardization is worse than none; and we have been careful to stipulate nothing that would tend to hinder progress, destroy individuality, or in any way limit the manufacturer in his effort to better and improve his product. The intent is rather to encourage and assist in such improvement." Like Mrs. Brereton, Mr. Fogg is convinced that the day of the old order of canvasser has gone by, and that the demand now is for salesmanship of the highest order. What is done in the way of educating salesmen is described in the paper; and no one can deny that a systematic educational course would benefit not only the salesmen of many gas suppliers, but of some of the salesmen employed by the manufacturers of gas appliances.

All this showed, as Mr. George Clarry put it, that our friends in America are working very thoroughly. We find Mr. J. Ferguson Bell, Mr. Thomas Glover, and Mr. Robert Watson all expressing their sense of the truth that the effectiveness of the old gas-selling methods is dead, and that skilled salesmen are imperative. Mr. Glover is very emphatic upon the point as to the disgrace of bad work in any direction on the part of a gas undertaking. Two notable points occur in Mr. Watson's remarks. The one goes to show the value of getting an insight of the work in which a manufacturer is engaged before talking to him about the way closer and mutual business relations can be established between him and the gas undertaking; and the other is an attack on the inefficiency of manufacturers' representatives in giving exact information. It was mentioned by Mr. Samuel Tagg that, at Preston, his Company spend three times more on their local publicity work than their contribution to the national expenditure through the Association. While not saying that the national expenditure could be dispensed with, he is quite convinced that the local work is more productive. When the returns come in as to the expenditure that is made on local publicity work in comparison with national publicity work, Mr. Goodenough promises some interesting data, without divulging the names of any undertaking. He points out that the Association has never suggested that their work can displace local publicity effort; and it must not be thought that it will. Mr. W. E. Price was the one member who elicited from Mr. Fogg the most interesting information as to what is the character of the work of the numerous Committees mentioned in the appendix to his paper. It is in the happy combination of Association activity and Company activity that Mr. Fogg believes that the former is doing everywhere in America more than any company could do single-handed. What he had to say about the Committees can be instanced. The Industrial Fuel Committee are making a very close survey of that field. The work of the Domestic Fuel Committee has divulged the objections of domestic servants, which the Committee have shown how to correct. Mr. Fogg says they really feel much ashamed of themselves to learn how little they know of the grievances of those who use their appliances.

Business Principles.

The consideration of the foregoing matters finished the sittings on Tuesday; and on Wednesday (on which day better weather conditions prevailed) members assembled quite early in the morning in the Conference Hall at the National Gas Exhibition. They set to work immediately the President took the chair. We had heard much about business principles; but Mr. T. Waddom, of Newcastle-upon-Tyne, pictured the thoroughness and spirit with which things are conducted at Newcastle in the sales department. In his view there are two essential conditions to success: Efficient and satisfying service must be rendered to the consumers; and there must be a well-devised scheme of publicity. One important thing is to get existing consumers to increase their consumption by the adoption of new appliances, as this increase in business is obtained at a lower capital expenditure than is the case with new consumers, and so is more profitable. We will not traverse the whole of the paper to epitomize the requirements in a good and methodical sales department. But there are one or two striking pieces of intelligence that should be given the prominence of extraction from the rest. One thing that Mr. Waddom strongly advises is that the representatives of the gas undertakings should cultivate good relationships with doctors. They seem to have done so with remarkably good result in Newcastle; for upwards of 88 per cent. of them use gas-fires. Incidentally referring to the importance of the industrial load, he mentions that two recent industrial gas installations in Newcastle will probably result in an annual consumption of 200 million cubic feet of gas. "Consumptions such as this," truly says Mr. Waddom, "are worth a great deal of publicity to obtain; and I feel certain that, if there had not been the recent progress in the gas industry, this business would not have been secured." Working arrangements with local tradesmen are advised; one has just been settled at Newcastle. Mr. Waddom also advocates the maintenance of everything; and someone elicited from him that the charge made for the maintenance of a gas-fire is 1s. A special complaints staff is among the recommendations; and later in the paper is information as to the constitution of the Newcastle sales staff. This is an indication of the many good things found in the contribution.

In the discussion, we failed to detect any criticism; all was approval and elaboration. It was so in Mr. John Young's remarks, and those by Mr. Alex. Wilson, Mr. George Stevenson, Mr. W. Titley, Alderman Armitage, Mr. Goodenough, Mr. Councillor Squire, and Mrs. Cloudesley Brereton. It should be mentioned, however, that Mr. Stevenson, who has had a fierce fight at Long Eaton with municipal electricity, and whose Company have just issued a writ against the local authority for unfair trading through, apparently, preferential treatment, says that his Company were one of the first to join the Association; and he believes that, had the subscription been 10s. per million feet, they would still have joined. There was another point that he made; and it is the advantage of lady inspectors and instructors. The knowledge of good cooking is very limited among the poor; and the work the lady inspectors do in this direction is exceedingly useful. At Long Eaton, a complete record of equipments is preserved, and there is periodical inspection. The Company keep in close touch with schools; and they subsidize builders to leave positions in houses for gas-fires. This means capital expenditure. But it must come back sooner or later; and Mr. Stevenson's outlay in this connection has been repaid to his Company time after time. Alderman Armitage believes that the problem of propaganda work would be practically settled by lowering the price of gas. Several pieces of advice were found in Mr. Goodenough's remarks. He believes in inspectors making a thorough investigation when consumptions are seen to have risen or fallen abnormally. When apparatus is fixed, there should afterwards be inquiry into the way it is behaving. His men consider that this is asking for complaints, to which his reply is: "If there is cause for complaint, I want to know of it." Inquiry has also an opposite effect; it produces testimonials of satisfaction. Politics were eschewed at the meeting by Mr. Councillor Squire, of Belfast; the problem of Ulster did not agitate him one jot while in London. He is very favourably impressed with the value of the lady inspector; because, after all, it is the lady of the house who has to be pleased in connection with gas consumption. It was good testimony to Belfast management and to Mr. James D. Smith, the Engineer, to learn from

Mr. Squire that the price of gas in the city is only 1s. 9½d. per 1000 cubic feet—the coal being brought from England. Mrs. Brereton scored one when she pointed out to those who had on the previous day called her an idealist, that Mr. Waddom at Newcastle is carrying out practically all her recommendations. With the discussion, Mr. Waddom was naturally very pleased; and he wound up his reply by remarking that the very foundation of all he had said in his paper was "Good service."

Hot-Water Supply.

This is a popular subject in the gas industry to day; and it is to be rather regretted that the long discussion on Mr. Waddom's paper somewhat crippled debate on Mr. Broadberry's contribution, seeing that the members and visitors had a luncheon engagement with the Metropolitan Gas Companies. With Mr. Broadberry, we believe that gas and (let us add) coke are going to have their own way in the hot-water supply field. Our friend is confident. While he shuns the *rôle* of a prophet, he finds little element of prophecy in saying that the use of coal as a domestic fuel is doomed to rapid disappearance. But there is much work to be done, for the public have not yet generally realized the potentialities of relief and improvement which gas possesses for the purpose. Mr. Broadberry appears to be well satisfied with the choice of apparatus that is now on the market, among which he finds types high in efficiency and capable of dealing with any kind of demand that may arise. He shows in the course of a general description of the types of apparatus that fall into the classes of circulators, geysers, and water-boilers, the great developments that have taken place. It is quite possible now to get water-heating apparatus that will give an efficiency of 80 per cent. of the gross heat value of the gas. There is a warning here, and it is in water heating not to speak in terms of net calorific value; it is the gross that matters. "Indeed, some experimenters working water-heaters at their most efficient rate, and under the best conditions, by erroneously basing their calculations on the net heating value have obtained apparently over 100 per cent. efficiency, which is an absurdity." The figures given in the paper show how well the Tottenham Company have done in this matter of developing the water-heating business.

Had there been time, there would have been a much more prolific discussion on the paper, as the use of gas for water-heating is being talked of everywhere in gas circles, and all, like Mr. W. J. Sandeman, of Croydon, agree as to the enormous field that there is in this line of commercial work. At the present time, his Company are inundated with inquiries. He had a dig at those representatives of manufacturers who state that, in installing their particular types of appliance in connection with existing house systems, nothing but a T-piece has to be inserted. His experience is that installation is not such a simple job as that. He advises maintenance, and specially trained men to look after this important work, in which detail has such a big influence on success. There was corroboration by Mr. W. M. Valon, of Stafford, of Mr. Broadberry's point as to calculating the efficiency of water-heating apparatus only on the gross calorific value of the gas, and not the net value. Of course, water-circulators and such-like are not suitable for the majority of houses in all areas. For instance, in Wakefield, Mr. Harry Townsend finds that the working man likes the gas-heated wash-boiler; and his Company have about 1000 of these in use at the present time. He wants the makers to produce a boiler of this kind from which the water can be readily removed, but it must not be by a tap that is available for children as a plaything, and by which they can scald themselves. Mr. Potterton, Alderman W. A. Nicholls, Mr. Douglas Helps, and Mr. Goodenough contributed to the discussion; and from it all it is clear that the hot-water problem is different for different class houses, and no one system can be applicable to all. Mr. Broadberry, like Mr. Townsend, has come to the conclusion that the thermostat is an essential to the success of the water-circulator.

Industrial Uses of Gas.

The paper last referred to completed the sitting on Wednesday morning; and then there was an adjournment in order to have luncheon in the banqueting hall at the invitation of the Metropolitan Gas Companies, as fully reported in other columns. The interest attaching to the luncheon prevented the sitting in conference being resumed until nearly four o'clock, and the pity of it was that there was then rather a sparse audience—a pity because the paper that perhaps was the most imposing from the practical point of view of the whole conference, was to be taken. It was the one by Mr. H. M. Thornton, on the "Development of the Use of Gas for Industrial Purposes." In the original it is voluminous through the mass of illustration it contains, in order to impress through the optic channel the enormous scope that the industrial application of gas holds out. But it was as interesting as voluminous; and we predict with confidence that the paper will exert a good influence throughout the land. The author could only touch typically upon some of the more prominent uses of gas and some of the smaller uses in industry, in order to show the range of applications. He is confident of this that, if there is only a systematic handling of the industrial business in every gas-supply area, there is business to be done, and a remarkable business in certain areas. The fact of the matter is that the managements of many gas undertakings have at present no real conception as to the full scope of the application of gas in industry, with mutual benefit to themselves and to the manufacturers. The paper will be suggestive as well as advisory; for if, in all the industrial work enumerated, gas can be applied, then every gas salesman will say to himself why not in other lines of production? It is no use trying to make any prominent point from the contribution, because every page contains one or more tales of application. It must be read; and the stimulus of increased knowledge will be the result.

The discussion was brief—all too brief—as the hour was late. Mr. S. R. Barrett dipped into history, and told how the late Sir William Makins used gas and about 800 feet length of pipe for warming purposes at Lowther Lodge quite thirty years ago. There was allusion by Mr. Barrett to many items in the paper. Among other things he mentioned that the heating of bakers' ovens had not been very successful in Birmingham; and he emphasized the point that in oven-heating for stained glass work, it is very essential that the gas should be sulphur-free. Mr. Charles Clare and Mr. Cyril Davis spoke; the latter finding in the paper the spirit of co-operation, for Mr. Thornton had taken good care to illustrate his trade opponents' goods as well as those of his own firm—in fact, he recognized that Mr. Thornton had successfully tried to be thoroughly disinterested. Mr. Davis also called to mind the work of Mr. Thomas Fletcher in connection with the industrial uses of gas. The closing words in the discussion were by Mr. Goodenough, who remarked that, until they read this paper, they did not grasp in its true fulness the fact that gas is the universal servant of man.

The New President.

Pursuant to the change effected in the rules the previous day, the members indulged their new liberty by unanimously electing Mr. Bailie Paxton, of Glasgow, to the Presidential Chair in succession to Mr. Allen. As the ample figure of the popular Bailie rose to acknowledge his election and to promise of his best, the members gave him a volume of applause that will afford him an overflowing measure of confidence in the success of the coming year's work.

To Glasgow Next Year.

A cordial official invitation came from Glasgow to the Association to hold its next annual conference there; and with a heartiness that showed the full appreciation of the members, the invitation was accepted. Glasgow, past experience proves, knows how to welcome and treat its visitors, and how to contribute to the success of the mission of those whom it receives as guests.

Thanks to All.

The untiring devotion that Mr. Allen has shown to the work of the Association during the time he has occupied the presidential chair was the subject of a very happy little speech by Mr. H. James Yates, which he wound up by proposing that the members thank Mr. Allen as he deserved to be thanked. There was hearty compliance. Then, in turn, came thanks to the General Committee, the Executive Committee (special mention being made of, and special cheers given to, Mr. Goodenough), Mrs. M. A. Cloudesley Brereton (the Editor), and Mr. W. M. Mason (the Secretary), who did not forget to say a grateful word for his staff.

With from the President the words: "The conference of 1913 is ended," the members left the hall, but, before separating, a number of them had tea together.

BAILIE THOMAS PAXTON, J.P., of Glasgow,
Mr. Allen's Successor in the Presidency of the Association.

GENERAL REPORT.

The proceedings commenced with the reception by the Lord Mayor (the Right Hon. Sir David Burnett, J.P.).

Welcomes and Thanks.

The LORD MAYOR: Gentlemen,—I have the greatest possible pleasure, as Lord Mayor of the City of London, in offering a very cordial welcome to this ancient Guildhall to the members of the British Commercial Gas Association, which includes representatives not only of all the principal gas companies of the kingdom, but also of all the leading corporations which own their own gas-works—including, among others, Birmingham, Edinburgh, Glasgow, Leeds, Manchester, and Salford; the private undertakings of Dublin and Cardiff being also represented. And then, not least, though last, I am sure everyone will be delighted to know that the principal cities of the four nations are represented, and also that we have visitors and international members from Belgium, France, Germany, Holland, Italy, Denmark, Japan, the United States, Australia, and New Zealand. [Applause.] We are especially delighted to see our foreign friends here to-day. This Association, which I recognize is doing a useful public work, was established in the year 1911 to advance the great national gas industry; and that it has achieved a very safe position, and one of great importance, is testified by the fact that it represents an industry in which are invested about 140 millions sterling, employing somewhere about 100,000 men, exclusive of those employed in the allied and dependent trades associated with this great national industry. It seeks, by means of lectures, essays, and in other ways, to further the interests of the industry. Possibly not the least important part of the work was that wonderful exhibition which we all had the pleasure of visiting the other day, for the purpose of advancing an economic and hygienic knowledge of this great industry and its advantages as applied to domestic, industrial, and manufacturing purposes, and perhaps more especially of emphasizing and bringing to the minds of the people the advantages of coal gas as against smoke-producing products as a means of heating. If the knowledge of its advantages and its economy becomes more general, it must have a very powerful influence, and a far-reaching influence, upon the health and happiness of the people in time to come. So that, gentlemen, in asking your permission to vacate this honourable position in favour of your President, Mr. Edward Allen, I shall leave you in the absolute assurance that your deliberations will be not only of advantage to the particular industry with which you are connected, but that they must prove of the greatest benefit to the public at large, in whom I am more particularly interested. [Applause.]

The PRESIDENT (Mr. Edward Allen, of Liverpool): My Lord Mayor, ladies, and gentlemen—I have the honour of moving the following resolution: "That the best thanks of the Association be accorded to the Lord Mayor for his reception of the Association, and to the Corporation for their kindness in placing their Council Chamber and Guildhall at the disposal of the Association for the purposes of the conference." In moving this resolution, Sir, I desire to express our sense of the great value of the privilege and honour conferred by your Lordship and the Corporation on our Association. [Applause.] To many of us, this is our first visit to this great, this historic, building; and we, as an Association, are proud because you have received us as you have received so many of the representative bodies of the great industries of the country in this important and historic chamber. The great favour recently bestowed upon the gas industry by your presence at the National Gas Conference and Exhibition is fresh in our memories; and this additional favour fills our hearts with gratitude. We would also express our great admiration for the courtesy and grace which adorned your patronage of our great public industry. I will now call upon Colonel Gascoyne to second the resolution of thanks.

Colonel G. GASCOYNE, J.P. (Chairman of the Derby Gaslight Company): Mr. Chairman, ladies, and gentlemen—I have been asked to second the resolution which has been so gracefully proposed by Mr. Allen, according a vote of thanks to the Lord Mayor and Corporation of London for allowing us the use of this hall for the purposes of the Association. I know, as of course everybody knows, how well and how worthily the Lord Mayor has fulfilled the duties of his high office ["Hear, hear"], and has followed in the footsteps of a long line of predecessors in unremittingly maintaining the honour and the dignity of the Corporation, and the prestige of this great, ancient, and honourable City. The public naturally look for a leader in these social functions and charitable institutions which his Lordship leads so well; and there is no position in which a more representative leader can be found than in the person of the Chief Magistrate of this City. The Lord Mayor is naturally the patron of every great invention of modern times, and he has also to keep a very watchful eye upon all the doings of the day. He sees with a keen eye those who soar in the air and visit the clouds and the sunshine; but he does not neglect those more mundane pursuits of the persons who are instrumental in invading the terrors of darkness and shedding their light, whether it be by means of electricity or the more—well, at any rate, the very useful purpose which is performed by a gas exhibition of this nature. His Lordship is also prominent in all charitable institutions; and he not only looks upon those who suffer from the terrors of mid-ocean, and also those terrible visitations in the underground realms of the mines, but he also gives the advantage of the influence of his high position to stimulate generosity and to touch the hearts of charity. He is very ably assisted by all the Corporations of London. I have great pleasure in seconding the resolution which has been proposed.

The PRESIDENT: Ladies and gentlemen,—You have heard the terms of the resolution that has just been seconded so ably by our friend Colonel Gascoyne, of Derby. I have now the pleasure of putting it to the meeting.

The resolution was passed with acclamation.

The LORD MAYOR: Gentlemen,—I will convey this expression of your thanks to the Corporation which I represent; and I know it will be very greatly appreciated by them. For myself, personally, I am here in pursuance of my public duty, but also, I am glad to say, it has afforded me real pleasure and delight. [Applause].

The Lord Mayor then vacated the chair.

The PRESIDENT: Ladies and gentlemen,—We are highly honoured to-day in having with us Sir Corbet Woodall, who has come to represent his own Company and the other great Companies of London, and give us an address of welcome to the City. I now call on Sir Corbet Woodall.

Sir CORBET WOODALL: Mr. President, ladies and gentlemen,—I am not responsible for, as I was not consulted as to, the drafting of the *agenda* for to-day's proceedings; but I beg to assure you that I had no intention of attempting to interpose an address between you and the business of the day. Nevertheless, I am proud to be permitted, on behalf of the Gas Companies of London, to follow the Lord Mayor in bidding the Association a welcome to London. This is our second meeting. You will remember that last year we were received by the Lord Mayor of Manchester, who gave us the use of his rooms, who presided at some of our functions, and who did everything in his power, with the Corporation of the city behind him, to make our visit acceptable to us. He was ably seconded by the Mayor and Corporation of Salford, including Alderman F. S. Phillips, whom I am glad to see here to-day. They vied with each other to make our visit pleasant and profitable. I should like to say, with regard to this, that the example they set us had, I am sure, a great deal to do with the cordial and happy relationships that were created at the meeting, and which made our meeting in Manchester full of present good and the promise of future advantage. ["Hear, hear."] To-day we have been received by the Lord Mayor of the City of London, the Chief Magistrate of the greatest of great cities; and I think that the words he has spoken in receiving us will not readily be forgotten. I would say, with regard to the great honours that have been done to us, that they are not simply of value as the expression of goodwill on the part of great citizens and distinguished men, but they give dignity to our proceedings, and they convey an impression of what is looked for from an Association with a membership and with means at its disposal such as ours. I hope we shall be able to live up to the expectation. So far as the Gas Companies of London are concerned, we recognize the value of the work done by the Association. We have done, I think, fairly well in the matter of contributing to its funds; and we will forward its interests in every way open to us. We are engaged in an effort to make known the potentialities and possibilities of the great industry with which we are associated, and which as yet are, I think, but very imperfectly known. Then we ask, in our turn, for help from the Association; and we believe that this help will be as efficiently rendered in the future as it has been in the past, and not simply to us in London, but to every gas undertaking throughout the whole Empire. May I here say that, in offering a welcome to the members of the Association, we desire it to be understood that, so far as we have anything worthy of inspection, whether on the works or elsewhere, the members of the Association will be cordially welcomed wherever they may present themselves. ["Hear, hear"]. To-morrow I hope that we shall all meet at Shepherd's Bush. We shall see there embodied an effort, such as the gas industry has never yet attempted to put forward, to make known to the public in an efficient and clear manner the innumerable uses and advantages of gas. In the inception of this idea a considerable number of those who are members of the Association took a prominent part; and I have no hesitation whatever in saying that in its present form, and achieving the unqualified success which it already has done, it would have been impossible had it not been for the spirit of co-operation and goodwill, which, if not born in Manchester, had at any rate a very great impulse there—an impulse which I hope will go on and combine together in the same spirit of hearty co-operation all the branches of those engaged in the promotion of our industry. [Applause]. Gentlemen, I can only express the hope that our meetings this year will be equal to—I can hardly hope that they will be superior in importance to—those with which the Association was inaugurated in Manchester a year ago.

The PRESIDENT: Ladies and gentlemen,—On your behalf, I desire to return very sincere and hearty thanks to Sir Corbet Woodall and the London Companies for the welcome they have given us to-day. It is extremely difficult for me to express adequately our indebtedness to Sir Corbet for his very kind welcome. We cannot look upon him as only representing the London Companies, but as the great leader of the gas industry throughout the world, and as wearing until quite recently the triple crown—President of the Institutions of the industry and of our Association. We are sincerely grateful to the undertakings that he represents, through each of which the Association and the industry have greatly benefited. Gratitude is said to be a lively sense of favours to come; and in this connection we look forward greatly to the hospitality which the Companies propose to extend to the members of the Association to-morrow. The industry owes very much to the London Companies, and this Association to even a greater degree. But, referring only to our National Gas Congress and Exhibition, it may be said at once that, without the great aid rendered by the London Gas Companies, the exhibition would not have been possible; and we desire to express our high appreciation of the great skill and the devotion with which the staff of the London Companies have worked at our exhibition. It has not been a case of eight hours a day, nor of twelve hours a day, but I afraid it has been a case of having two or three hours sleep and the remainder of the day spent at the exhibition or working for the exhibition. I cannot conclude my remarks without referring to the special benefit the industry is deriving from the action of one of the great Companies. While all of the Companies have joined in the work of the exhibition, the industry is indebted to the South Metropolitan Company for the splendid manner in which they have kept our end up at the Ideal Home Exhibition. [Applause.] The exhibition there is really something we are proud of; and we desire to express publicly our appreciation of the work done by the second of the great London Companies. Sir Corbet Woodall, will you receive from this meeting our very sincere and hearty

thanks for the kind welcome you have given us for your own Company and the London Companies generally?

Sir CORBET WOODALL: Will you permit me, Sir, to make amends for an omission on my part which was really unpardonable. In welcoming the Association here, I failed in what was expected of me to couple your name with it, and to say how much we hope that the meetings will be to your great satisfaction. We know they will be to the advantage of the Association generally.

President's Address.

The PRESIDENT: May I just preface my address, ladies and gentlemen, by saying with what great pleasure I preside over your meeting, the more so as my reign will probably be very short as President of the Association? We are here this morning, if I may be allowed to say so, with a bright morning face, beginning the work of your conference; and I have a strong feeling that this conference is going to prove of very great value to our industry. Though we did have a great success at Manchester, I trust that London, with all its possibilities, will enable us to have a still greater success; and I will leave it for my successor to say something of the same when he comes to the third great conference.

The President then delivered his Inaugural Address, as given in the "JOURNAL" last week (p. 207).

Mr. F. W. GOODENOUGH (London): Ladies and gentlemen,—I will now call on Dr. Gray, of Hastings, to propose a vote of thanks to the President. I understand that Dr. Gray has recently been suffering from severe illness.

Dr. G. G. GRAY, J.P., LL.D. (Hastings): Gentlemen,—An unexpected honour has been bestowed upon me in being called upon to move a vote of thanks to the President of so great an Association as this. I respond, however, with the greatest pleasure to the appeal, not only because, as I have said, it is an honour, but on account of the abilities of the gentleman whom you have selected as your President, which have been so well displayed in the address to which we have all had the pleasure of listening. A more practical or a more useful address it would have been difficult, I think, for anyone to have delivered; and I am sure the Association will benefit generally by its circulation widely throughout London. I hope that the circulation will be very extended, and that we shall all derive the benefit that will result. I am sure I express the feelings of one and all when I say that we are greatly indebted to the President for his address to-day, and that we look forward to similar services during his year of office, for which we shall be equally thankful. [Applause.]

Mr. GOODENOUGH: Ladies and gentlemen,—I am sure we are all glad to have had such evidence that Dr. Gray is now restored to health. I will ask Alderman Dewhurst, the Chairman of the Accrington Gas Committee, to second the resolution.

Alderman DEWHURST (Accrington): When I received a letter from your Secretary asking me to take upon myself the important duty of seconding this resolution, I felt it was a very great honour indeed, not particularly to the Chairman of the Accrington Gas Committee, but to the Board itself. Being from North Lancashire, the same county to which you yourself belong, I feel that a very great honour has been conferred upon me. I am sure, after what Dr. Gray has said with regard to the address from the chair to which we have just listened, there has been placed before us much food for reflection. It is a pleasure to know that the gas industry is waking up to a sense of its duty by tackling those who are strongly opposed to us—namely, the electric light companies—and I hope that the result of these conferences may be of great advantage to the gas companies and committees throughout the country. I will not take up any further time. I am sure that I echo the voice of every gentleman present when I say how proud we are to see Mr. Allen finish his year of office so successfully, and with such an able address as we have listened to this morning.

The resolution was carried with acclamation.

The PRESIDENT: Ladies and gentlemen,—I am very grateful to Dr. Gray and Alderman Dewhurst for the kind things they have said, and to you for the kind way in which you have received the resolution.

Annual Report and Accounts.

Mr. GOODENOUGH: Mr. President and gentlemen,—I now have the honour to submit to you, on behalf of the General and Executive Committees, the report upon the work of the Association during the past year. This has already been circulated to members; and I presume therefore that it will be in accord with the wishes of the members that the report should be taken as read. The statement of accounts for the past year has been duly audited, and is now in the hands of members. I have been asked by the Committee to make some explanatory observations on the accounts and the annual report. [The report will be found on p. 208 of last week's issue.]

The outstanding item in the accounts that will have immediately attracted the attention of members is the sum of £2376 by which the expenditure for the year has exceeded the income. Upon this I have to say at once that such an excess of expenditure was deliberately arranged for by the General Committee when they considered the estimates for the year. Owing to the fact that the operations of the Association had not been in full swing for the twelve months ending Sept. 30, 1912, there was carried forward from the accounts for that year a balance of £4400, which is a larger sum than is necessary for providing stock and floating cash for our work. It was therefore felt by the Committee that it would be to the advantage of all that the balance carried forward from the year just ended should be reduced by expenditure during the year to an adequate, but not an excessive, amount; and it will be seen by the balance-sheet that the balance on Oct. 1 was just over £2000, which is a sufficient sum to provide the Association with working capital.

By spending more than they have received during the year, the Association have been able to demonstrate the possibilities of their usefulness to a more marked degree than would have been possible had they kept within the limits of their income; and, by so doing, the Committee believe that they have been able to secure for the Association a greater measure of support in the future than they otherwise would have done, and that they will not have to diminish their activity in the current and future years, as the income of the Association is still steadily increasing, and will, they believe, very considerably increase in the near future. I should like to mention here that we have just had two subscriptions, each of five guineas, one from Australia and the other from New Zealand. We are very glad to be able to add these to the list of our supporters.

I should mention that the dip into the balance brought forward would have been smaller, but for the fact that the contribution received from the Society of British Gas Industries did not increase proportionately as much as did those from the gas undertakings, and did not reach the total which the Committee felt justified in counting upon when their estimates were framed at the beginning of the financial year. This fact was no doubt due to the call upon the manufacturers for contributions to the funds of the National Gas Exhibition, which has been proportionately a heavier tax on the manufacturers than on the gas undertakings—that is to say, whereas the amount contributed to the exhibition funds by the undertakings, together with their local expenditure upon the exhibition, has been about equal to their contributions to the Association during the year, the amount subscribed to the exhibition by the members of the Society of British Gas Industries has been five times as great as their contribution to the Association. The Committee therefore look forward with confident expectation to a substantial increase in the amount contributed by the members of the Society of British Gas Industries during the current and future years; and they will be greatly disappointed if they do not have at their disposal for expenditure during the current year at least £20,000 from all sources, after paying the administration and other expenses of the Association.

When, in company with our worthy President and other representatives of the Institution of Gas Engineers, I had the honour of laying before the historic conference at Salford, presided over by our staunch supporter, Alderman Phillips, the case for the universal support of the scheme for co-operative publicity which was then being formulated, I

stated that, in my opinion, at least £30,000 a year could be spent with advantage to the industry upon forms of publicity that could not be undertaken by any individual company or corporation, in addition to the amounts expended by individual undertakings upon their local publicity work; and our experience since that date leads me to increase, rather than reduce, this figure. The papers and periodicals in which the Association is at present advertising constitute only a small proportion of those in which the claims of gas ought to be persistently advocated, if they are to be brought adequately before all classes of the community in the way in which the advertising of the Association can bring them —that is to say, in a way which no local advertisements have the power to do. Moreover, the advertisements which are appearing in the papers in which we do advertise are, generally speaking, too small, and appear too infrequently. Apart from the question of direct advertisement, there are other channels for profitable expenditure, into which we are at present unable to pour anything like sufficient money. Our research work might be extended, our lecture work might with great advantage be materially increased, and the publication of suitable special articles in technical and trade papers might also be developed with great advantage. The Committee are, in fact, constantly obliged to "turn down" good schemes for furthering the interests of the industry, for want of the necessary money. But, as I have said, they confidently look forward to, as they earnestly appeal for, increased support from both branches of the industry. It is a matter of much satisfaction to the Committee that we have now the support, measured by output, of 77 per cent. of the gas undertakings of the United Kingdom. But we want the support of 100 per cent.; and we want the support on the full basis of 2s. 6d. per million cubic feet—and we believe that we shall get it.

The Committee are greatly encouraged and greatly gratified by the fact that a number of most progressive undertakings, pioneers in the field of the commercial development of the industry, who at first withheld support from the Association because they were not satisfied that they would be justified in contributing to its funds in addition to spending considerable sums upon local publicity work, have now added their names to the list of supporters, and sent us substantial subscriptions, though not in all cases as yet upon the full basis. Foremost among these the Committee record with the greatest satisfaction the name of the South Metropolitan Gas Company [applause], a Company who have been in the van of progress in the gas industry as long as the memory of man recalls, and whose absence from the ranks of the Association was always a source of keen regret to the Committee, though they appreciated the position taken up by the Board, and fully recognized the value of the work performed by the South Metropolitan Company for the benefit of the industry as a whole, in the past and in the present.

We hope that, as time goes on, the value of the work done by the Association, and the possibilities of greater services that could be rendered were greater funds available, will win the whole-hearted support of every undertaking that is at present either not supporting the Association at all, or only doing so in a partial manner. The Committee, however, recognize, as they have always recognized, that the onus is upon the Association to prove its value to the industry; and they blame no man for withholding his support from the Association until he is convinced that the money subscribed to it will produce adequate results, and will bring benefit to the industry in every city, town, and village in the kingdom.

It is, therefore, a matter of very great satisfaction to find that, month by month, the number of boards and committees at home and abroad—for, as I have said, we have two more subscriptions to report from the Antipodes, one from Auckland (New Zealand), and one from Newcastle (Australia)—who are convinced that the Association is doing valuable work for all, steadily increases; and now that the principle of co-operative expenditure has become fully established—and the National Gas Exhibition is concrete evidence of the extent to which this principle has been established—the Committee feel confident that, as with other habits, the habit of spending co-operatively will grow, and that they will be able to devote to the detailed work of the Association those energies which hitherto they have had to devote to the work of securing increased support. I am sure that every gas manager throughout the country now realizes what a splendid thing it is to have in existence an organization with the power of money behind it, ready and able to act, at a moment's notice, on behalf of the industry, either as a whole, or in particular places where its interests are being unfairly threatened, and that he has an organization to which he can go for assistance in any local emergency, and know that he will have the accumulated experience of the Association, and the cumulative effect of its power, at his service then and there. I venture to say that, if the Association were to be closed-down to-morrow, every gas manager in the country would feel that his power in his district had been sensibly diminished.

Now let me turn to the question of how the Committee have spent the £19,165 that was expended during the year under review. Well, of this amount, £701 (or 3¾ per cent.) was expended upon the first annual conference. This amount paid for itself several times over—first, in the publicity which was given to gas in the Press; secondly, in bringing the work and the ideals of the Association to the notice of the public; and, thirdly, in the marked increase in the support which the Association obtained from those undertakings which had previously either held aloof altogether or only subscribed in a partial manner. The expenditure on the annual conferences will not be so great in future, as the entertaining of the representatives of non-subscribing undertakings will no longer figure in the expenditure. Another 1¼ per cent. is represented by the expenditure on the "Bulletin," which is doing such valuable educative work among the staffs of subscribing undertakings, and to which the Committee will be glad to have further subscribers; while 5 per cent. went in the cost of administration. This, I think it will be agreed, is a very moderate rate of expenditure; and it should be remembered that such a low percentage is only rendered possible by the fact that there is no board of directors to pay. The services of those who would in another undertaking constitute such a board are freely given by all members of Committees through the courtesy and generous consideration of the undertakings they represent—the only cost to the Association being the travelling expenses of the members of the Committees who come from outside London.

The administration expenses are also kept down by the fact that the Literature Department is debited with its fair proportion of salaries and office expenses; and the increasing business done in the sale of literature is likely in future to reduce to vanishing point the cost of the literature issued as samples, and to the public in response to inquiries, which figures in the accounts for the past year at over £500. It should be stated that this figure was considerably increased by reason of the fact that the stock of literature in hand was written-down to considerably below cost, and that no valuation was put upon the stock of drawings possessed by the Association, which will be utilized again in the future, and will reduce the cost of prepared literature and advertisements during the current year.

The sales of literature have greatly increased during the year; but what is £3526 for an industry of our magnitude to spend upon advertising literature in a whole year? If all subscribing undertakings were proportionately as active in the distribution of advertisement matter in their districts as are some of the smaller ones, our sales would in a short time run into five figures annually. Will members please acquaint themselves fully with the possibilities of our service in this direction, and will their directors and committee members realize the value of the persistent circulation of well-written literature among consumers? They will have opportunities of doing so at the exhibition, where the Association has an Inquiry Bureau, in which samples of all kinds of literature are to be found. It may be mentioned here that steps are being taken to extend the scope of our literature so that it shall better cover all classes of consumers in all classes of districts; and in this connection the Editor and the Committee will always be glad of suggestions and criticisms.

This reference to the use of literature in local publicity work leads me to emphasize the point that those undertakings which are most active locally are those that benefit most from the national campaign. The Association does not—it cannot—abolish the need for local activity. Indeed, it calls for the fullest possible local activity, to enable each undertaking to water and gather in the harvest that can be reaped from the seeds sown by the Association. Not only is there need for activity in local publicity, but there is also need, and ever-increasing need, for the rendering by the local gas undertaking of good service, for the adoption of really

commercial methods in the office and on the district, for the putting away of all high and mighty red-tape methods of treating the public, for the offering of full facilities to the public for obtaining the gas appliances that are available for their use, and for the establishment of a competent fittings and maintenance service, so as to make every gas undertaking in the country a real "house of business" to which the public can look with confidence for businesslike, equitable, and efficient service. It is no use giving 2s. 6d. per million feet to the British Commercial Gas Association, and then giving your consumers ill-informed advice, ill-mannered attention, and indifferent workmanship. It would be better to keep your money to eke out your fading profits in the years to come, because they would be bound to fade. It is no use the Association being commercial in its methods, if the subscribing members are autocratic and antiquated in theirs.

The remaining £17,368 of expenditure, or 90 per cent. of the whole, has been spent upon actual publicity work, from which every undertaking in the country is in its proportion benefiting. This money has been spent in the purchase of space, in the preparation of copy (both literary and editorial) that has appeared in that space, or in research and lecture work, which has provided valuable publicity copy, either directly or indirectly; and the Committee feel that the subscribing undertakings will be gratified to know that, of every 2s. 6d. that they subscribed, 2s. 3d. has actually been expended upon missionary work for the industry.

It is not for me here to refer to the alterations in the rules of the Association which the President will commend to the consideration of the members, other than to say, on behalf of the other members of the Committee, as well as myself, how thoroughly they endorse the action of the President, and how greatly they appreciate, as they are sure that the other members of the Association will appreciate, the characteristic unselfishness, and the desire to serve the interests of the industry as a whole, which have animated him in bringing forward his proposition.

I beg to submit to you, gentlemen, on behalf of the Committee, the report and statement of accounts. [Applause.]

The PRESIDENT: Ladies and gentlemen,—You have heard a very excellent speech by Mr. Goodenough on the report of the Committee. This report has contained matters of great interest to every one of us. I think Mr. Goodenough has clearly explained it, and that there will be no difficulty whatever, when putting before you the resolution which I have the pleasure of proposing, in satisfying you that the report of the General Committee, with the statement of accounts, should be accepted, and that there should be included in my resolution the following words. It will be better that I should read the resolution in its entirety: "That the report of the General Committee, together with the suggested alteration in the rules, and the statement of accounts submitted therewith, be approved and adopted." This resolution, as you see, gentlemen, is in two parts. The first part is for the approval and adoption of the report and accounts, and that goes without saying. The work of your Committee has been very well done, and the members deserve the reward of "well done, good and faithful servants." [Applause.] The second part, probably, will need a little further attention on your part; but, considering that the General Committee have discussed this very fully, and that they unanimously recommend these alterations, I feel there will be no difficulty in obtaining the support of every member of the conference.

Let us consider the case for the alterations to the rules. First of all, the Association is an offshoot of the Institution of Gas Engineers; and in its formation it was deemed to be necessary to protect the young and tender plant from possible danger. To this end, in Rule 3, paragraph (*a*), we have it stated that—"The President shall be the President for the time being of the Institution of Gas Engineers." That is one safeguard. Then, again, in paragraph (*c*)—"and the members for the time being of the Council of the Institution of Gas Engineers shall be on the Committee of this Association." Then I go on to Rule 7, paragraph (*d*), which states that there shall be an Honorary Treasurer, who shall be a member of the Association, and be nominated by the Council of the Institution of Gas Engineers. Then, again, with regard to the Executive Committee, Rule 10, paragraph (*a*) says—"but so that two of them shall be members of the Institution of Gas Engineers and two shall be members of the Society of British Gas Industries." You see how thoroughly this young and tender plant was safeguarded in its formation. The time has come when this young plant has grown to be a strong tree; and it may be, some day, that we, the Institution, will rest under the shadow of its great branches. That may, or may not, be. It certainly has grown so strong that it is time we gave a little more liberty for its expansion, and for its even fuller growth. In Mr. Shadbolt and Sir Corbet Woodall we have had two excellent men who occupied both the positions; and we are greatly indebted to the labours of both these gentlemen. On the other hand, it is quite possible to conceive of a President of the Institution of Gas Engineers first of all not being a member of the Association, although, from what Mr. Goodenough says, that is almost impossible. But, at any rate, it is conceivable. Or he might be a gentleman most eminent as a gas engineer, and yet not able to bring to this office a very great amount of commercial experience, and, therefore, unable to render very great assistance. It is therefore suggested that, in respect of one safeguard—viz., that with regard to the President—we should alter our rule, and that it should run: "The President shall be elected by ballot from the list of Vice-Presidents by the members; and his term of office shall be from the close of the annual general meeting at which such election takes place until the close of the annual general meeting in the following year." If you look down the list of Vice-Presidents, you will see there an array of great commercial talent. You will see them here to-day. They are chairmen of gas committees or directors who are chosen to be chairmen because of their experience and of their great ability. This is the mine of wealth to which we purpose to go; and there has been a name mentioned—you have all heard it—the name of Bailie Thomas Paxton, of Glasgow [applause], who may be said to be a man pre-eminently suited to take the position that simply a gas engineer is occupying here to-day. All the other safeguards will remain; and therefore I have very great confidence in submitting to you the proposed alterations of rules. They have been circulated for some time. You have balloted upon the question of the new President; and I do not think I will take up your time by reading the alterations. But I may say that they are all consistent with making this one change—that you shall be free to choose your own President out of the list of Vice-Presidents, year by year, and that the voting will be by ballot.

Ladies and gentlemen, with very great confidence I propose: "That the report, the statement of accounts, and the alterations of the rules, be approved and adopted by this conference." I will call upon Mr. John Young, of Hull, to second the resolution.

Mr. JOHN YOUNG (Hull): Mr. Chairman, ladies, and gentlemen,—I have very great pleasure in seconding the resolution that the report of the General Committee, together with the suggested alterations in the rules, and the statement of accounts submitted therewith, be approved and adopted. Mr. Goodenough's explanation of the report and accounts was so lucid and so full, that I am sure no words of mine are needed to commend the resolution to you, so far as the report and accounts are concerned. Mr. Allen has also explained, very thoroughly, the change of procedure as to the election of President. This is a Commercial Gas Association; and it does not necessarily follow that every gas engineer is also a great commercial man. Those of us who are gas engineers, when we come into the Association, must sink the engineering part of ourselves entirely, and allow our commercial instincts to have the fullest flow. Those gentlemen who are at the head of great concerns, men noted for their commercial tact and ability, are surely the best men from whom to select our Presidents. I think the proposed alteration in the rules will be a source of great strength and advantage to the work of the Association, therefore I have much pleasure in seconding the resolution proposed by the President.

The PRESIDENT: The matter is now before the meeting. If any member wishes to make any observations, will he be pleased to do so now, or for ever after hold his peace.

Mr. H. KENDRICK (Stretford): Mr. President,—There is one matter to which I should like to call attention, and it is that the arguments which you yourself and Mr. Young have used, with regard to the administrators of great undertakings, will also, I think, apply to the representatives of the trading section of our Association. I think it is rather

an omission that we should have two sections of our Association eligible for the office of President, and that we should omit the third. I would ask, has this been considered by the General Council; and, if not, rather than move an amendment here to-day, I would suggest that it might be considered whether some further alterations in the rules, to this effect, might not be made?

Mr. GOODENOUGH: I would like to point out to Mr. Kendrick that this is not necessary. The proposed alteration in the rules says—"The President shall be elected by ballot from the list of Vice-Presidents." It is open to the Society, at any time, to nominate a Vice-President; and if the members of the Society wish to press forward any particular Vice-President, it is quite open to them to do so. I think this will meet the difficulty.

Mr. R. W. EDWARDS (Aldershot): It is to be hoped that members, if they contemplate exercising this privilege, will make up their minds equally to contribute to the Commercial Gas Association.

The CHAIRMAN: Are there any questions on the report that you wish to speak upon? I know you all wish to speak in terms of admiration of the Committee's work. That goes without saying, and therefore you need not all say it. But is there anything that you wish to say specially? I see nothing but pleased countenances all round the room, and therefore I will put the resolution.

The resolution was passed unanimously.

Appointment of Scrutineers.

Mr. Thomas Clapham (Keighley) and Mr. Charles Dakin (Cradley Heath) were appointed Scrutineers of the ballot papers.

Papers and Discussions.

The reading and discussion of the following papers was then proceeded with; and this portion of the business will be found in another part of the "JOURNAL" [see pp. 299-339].

"The Study of the Problems of Domestic Economy as a Factor in Salesmanship," by Mrs. M. A. CLOUDESLEY BRERETON, M.R.San.I.

"The Work of the National Commercial Gas Association, and American Publicity Methods," by Mr. OSCAR FOGG, of New York.

"The Application of Business Principles to Gas Supply," by Mr. THOMAS WADDOM, of Newcastle-on-Tyne.

"Hot-Water Supply as a Field for Increased Sales," by Mr. A. E. BROADBERRY, Assoc.M.Inst.C.E., of Tottenham.

"The Development of the Use of Gas for Industrial Purposes," by Mr. H. M. THORNTON, J.P., of London.

Scrutineers' Report.

The PRESIDENT: I have to announce that the result of the Scrutineers' examination of the ballot-papers reveals a very gratifying fact—that Bailie Paxton, of Glasgow, has been unanimously elected President for the ensuing year. [Applause.] I have also to announce the re-election of Messrs. Cash, Stone, and Co. as Auditors for the year.

Place of Next Meeting.

The SECRETARY (Mr. W. M. Mason) read the following letter from Mr. John Lindsey, the Town Clerk of Glasgow:

> Dear Sir,—I am glad to inform you that the Corporation have approved of the recommendation of the Gas Committee that an invitation be extended to the British Commercial Gas Association to hold their annual meeting in 1914 in Glasgow. I should be obliged if you will convey this to the members of the Association at their first meeting.—Yours faithfully,
>
> JOHN LINDSEY.

Mr. GOODENOUGH: Mr. President and gentlemen,—I have much pleasure in moving that the Association accept the invitation of the Corporation of Glasgow.

Mr. J. FERGUSON BELL (Derby): I have the greatest possible pleasure in seconding the resolution. We have a very pleasant recollection of the meeting in Glasgow two years ago; and I am quite certain that our next will be equally successful. I should also like to say how glad I am that Bailie Paxton is to be our President.

Bailie THOMAS PAXTON, J.P. (Glasgow): Mr. President, Mrs. Brereton, and gentlemen,—I have to extend to you my very sincere thanks for having elected me President. I look upon it as being a most important post, particularly on account of the extraordinary work the Association has been able to accomplish during the two years of its existence. I cannot tell you how much I thank you for appointing a layman like myself (who knows nothing about gas, but who would like to know a great deal about the selling of it) to such an important position. I have attended the gas engineers' meetings in London for the last seven or nine years; and I was first struck very forcibly with the selling side of the gas department by hearing Mr. J. W. Helps, of Croydon, the then President of the Institution of Gas Engineers, telling us of the very great importance of the selling side of the business. I have been a devoted follower and supporter of that side ever since; and when word came to Glasgow of the inception of the British Commercial Gas Association, it was imparted to us by our esteemed Engineer and Manager, Mr. Alexander Wilson, whom I am very glad to see here to-day. When I mention that we have a Corporation of 113 members, whose assent we have to obtain before we can get any grant made at all, no matter how good the object may be, you will readily understand that we have many stiles to get over; and I can assure you that in establishing the principle of contributing to the British Commercial Gas Association the Committee, I believe, never would have succeeded, had it not been for the extraordinary efforts of Mr. Wilson. Now, I wish to be perfectly frank with you. I do not know whether Mr. Wilson has had the credit or not; but his extraordinary efforts, as I have already said, along with a few kindred spirits, succeeded in recommending to the Corporation the payment of this sum of money. I do not think we have had anything to regret.

I am delighted to be able to look the members of the Corporation in the face, and say to them: "Look, now, at the results of what we did a few years ago." We only paid a part of the contribution the first year; but the progress made by the Association has been so great that it has led to the full amount being contributed. Since the full amount has been paid, our consumption of gas has gone up by leaps and bounds; and by the time we come to pay again, if we pay at the rate of 2s. 6d. a million cubic feet, we shall have to hand over more than £900. [Applause.] Now, gentlemen, the progressive, and, should I say, the somewhat democratic, Corporation I have the honour to represent I do not believe will turn back at all. At least, if they do it will not be my fault, because I will do all I can to induce them to continue the very substantial contribution to our work that is increasing the profit derived from the consumption of gas in Glasgow generally. I am sorry to tell you that inside of a fortnight I shall no longer be Chairman of the Gas Committee of the Corporation of Glasgow. According to the Standing Orders, no man can be Convener for more than three years. Whether this is right or wrong, I am not going to say; but I shall remain an active member of the Gas Committee of the Corporation, if my constituents will allow me. If I come back to the Corporation, I shall be as warm a supporter of all matters relating to the consumption of gas as when I was Convener. I see my successor Councillor T. J. Irwin here. In him, you have an enthusiastic supporter of the Association. He was a private member when it was first mooted; and he was one of those who stood very strongly against it. He was very frank, and told us he wanted to see daylight. Now the daylight has come, we have in Mr. Irwin one of the most enthusiastic supporters in the whole of the northern part of Great Britain.

Now I am not going to talk any more about Glasgow. I am going to speak about the other parts of Scotland. I am very sorry that quite a number of gas undertakings in Scotland, as well as in England and Wales, I believe, have not yet joined the Association. I really cannot understand how cities and towns of importance can allow this Association to go on with its advertising, and spending money, which must increase their consumption and add to their profits, while they smile and pay nothing. I was away recently in the north shoulder of Scotland, doing a public duty. I will not say where it was; but those of you who know your geography will know where I mean. There I saw the Convener of the Gas Committee; and I said to him, "What is the meaning of it? Why cannot you contribute to the Association? These magazines and newspapers are passing through your city, and you are benefiting from them. Do you not think it is your duty to pay for it?" He replied, "Oh well, there may be a day. We will see." I said, "You are something like a countryman of yours that I heard of who went up to London. He got a good post

there; and he was heard inquiring of one of his compatriots where a cheap restaurant was to be found. His friend told him of one; and on coming back he said, 'It was a very grand place you sent me to; there were fine lassies serving at the tables, and before I came away I found twopence below the plate.'" A few stories of this kind thrown at the head of that man will in the long run possibly get him to contribute.

Until Mr. Goodenough, at the opening of this exhibition, told me of the proposal to appoint me President, I had never heard of it. I was very much against it, because I cannot believe that I can do my duty 400 miles away from London, though I shall make every effort. I will ask those members who are in London and in the provincial towns and cities of England for their support; and I can assure you nothing shall be wanting in me if I can manage it. The next important thing I wish to refer to is the invitation that you have heard Mr. Mason read. Here I must come back again to that prince of organizers Mr. Goodenough, because it is he who has to "boss the whole show." It appears to me that it is he whom the makers of gas in Great Britain have to thank for the extraordinary progress that has been made in the consumption of gas, principally through the Association. I said to him: "I will get the Lord Provost to invite you, as he did with the Gas Engineers, without going to the Council at all." When the gas engineers were invited, we did not have to go to the Council; but I went straight to the Lord Provost, and he said, "Certainly." We have now a new Provost, and I went to him; but he said, "No, no; fight your own battle with the Gas Committee." I put the question to the Gas Committee; and they agreed unanimously. It then went to the Corporation; and the Committee's recommendation was confirmed there unanimously. Now, I want you all to come to Glasgow next year. It is a pity the meeting will not be held in August. If you come, we will be as good to you as we can. That is all I can promise; and I wish every success to the undertaking.

Votes of Thanks.

Mr. H. James Yates (Birmingham): A very pleasant duty has fallen upon me, and that is to propose a vote of thanks to our worthy President, Mr. Allen. You have heard this afternoon that Bailie Paxton has been elected President for the ensuing year. It is only through the unselfishness of our present President that Bailie Paxton has been elected at so early a date. I would ask you to mark your appreciation of the able way in which Mr. Allen has presided over this meeting.

Mr. Goodenough: I will give myself the pleasure of seconding, and putting the vote straight away to the meeting, as it needs no recommendation.

The motion having been received with acclamation,

The President said: I am very grateful to Mr. Yates and to Mr. Goodenough for this very kind vote of thanks. It has been a pleasure to work with those who are at the back and in the centre of the work; and although I am retiring from the office you honoured me to fill, I shall not retire from the business of the Association. I shall still, as far as is possible, do something to help the work forward.

Councillor Moorhouse (Wakefield): I have great pleasure in proposing that our best thanks be given to the Committee of the British Commercial Gas Association. We all recognize that the Association is carrying out a great work towards developing the gas industry. The industry during the last two or three years has developed largely; and a great amount of the increase is directly due to the useful work to which the Association has applied itself. One of the most weighty utterances was that which fell from Professor Lewes in his lecture last night, which was calculated to enhance the industry more than anything that has been said for a number of years. He has gone straight to the heart of the people. He has shown clearly that gas is such an essential commodity in the house that it adds to the health and comfort of every home. I am glad to see 77 per cent. of the capital in the industry is represented in the Association; and I hope soon the other 23 per cent. will be added. I cannot understand why all undertakings should not contribute to this useful work, because, whether they contribute or not, they reap the benefit of it. Our Committee have a moral claim on the support of all. One satisfactory feature is that the administration expenses are down to the very low figure of 5 per cent. This shows beyond all doubt that our affairs are administered in a very prudent and businesslike way. When the question was first mentioned to the Company I have the honour to represent, they willingly, and without any hesitation whatever, decided to contribute to the funds of the Association. There is one thing I should like to mention in conclusion; and I do not say it in any carping spirit. The district I come from is a great and growing industrial centre; and I hope in the near future the revenue of the Association will be considerably increased, and that you will not forget that we in Yorkshire will be very glad of a little more money spent in advertising in our centre. Our Chairman would have been present but for illness; but I was greatly honoured at luncheon to-day to see our old townsman's and esteemed and honoured late Chairman's portrait was hung in close proximity to some of the giants of the industry. I may say our Chairman and his father before him have presided over our Company for fifty years.

Alderman W. Armitage (Doncaster): Some men are born great, some achieve greatness, and some have greatness thrust upon them. Now, I was wondering how we should classify this young Association. I think we should put it in the middle department—namely, that it has achieved greatness up to now. It is all very well to arrange what you may call full-dress debates; but in corporate work it is always the man who prepares the soil who does the most useful part, though he does not always receive the credit of it. I have great pleasure in seconding the vote of thanks to the Committee.

The resolution was carried amid applause.

The President: I find, according to the agenda, that the Chairman of the General Committee has the duty of responding to this vote; and as I happen to be the Chairman, I thank you on behalf of the Committee for the very warm vote of thanks you have just passed.

Bailie J. A. Lindsay (Edinburgh and Leith): The motion which I have to submit for your acceptance is one which I feel absolutely sure in my own mind requires no words of mine to commend it to you. I am going to ask you to accord to the Executive Committee of the Association, of which Mr. Goodenough is the Chairman, our heartiest thanks for the work done during the past year. I do not wish to seem to be invidious; but, without offence to any of the other members of the Committee, I think I might be allowed to specially mention Mr. Mason and Mr. Goodenough. I do not know what the Association would have been without the marked and outstanding ability of Mr. Goodenough, backed up as it is by the able and devoted services of those who are with him on the Executive Committee. I ask you to accord to him, who must be recognized as the master-mind of the whole Association, our very heartiest thanks.

Alderman Phillips: I have much pleasure in seconding this vote of thanks. I have been associated to some small extent with Mr. Goodenough; and I have never met a gentleman so full of ideas or so full of activities.

The resolution was received with loud applause.

Mr. Goodenough: It is not easy for me to respond to such a cordial reception as you have given to this resolution. I want to protest against so much of the credit of the success of the Association being thrust upon me. My *confrères* on the Executive Committee have worked devotedly. We are a most harmonious Committee; but this does not mean that we do not discuss and thoroughly thrash out all matters that come before us. I should be very sorry if this meeting, or the members of the Association generally, received the impression that this was a one-man job, and that the Committee simply consisted of a number of gentlemen who came and said "ditto" to me, because it is not so. I am proud to possess the confidence of the Committee; and it is this confidence which has enabled me to do whatever work I have accomplished. But without the Committee the work could not have been done. It is the act of a united body, and not the act of one man, that brings about the results which are achieved by the Association.

Mr. Thomas Waddom (Newcastle-on-Tyne): It affords me great pleasure to move a vote of thanks to our Editor, Mrs. Cloudesley Brereton. Of the many things of which the Association has the undoubted right to be proud, I think

one is the editor. She sets us an example in several ways for imitation, if we are only wise. I will merely mention three—her high ideals, her working capacity, and her enthusiasm. Her high ideals are generally practical; and nothing can be accomplished by us unless we have high ideals. Our motto should be, "Aim high and try." As to her working capacity, I think she often sets us an example that only she could set. As to enthusiasm, she is brimming over with it; and we humbly wish that we may have some, because we all stand in need of it. She puts the ideas into our heads. I think the appointment of a Lady Editor was a decided advantage to the Executive, because when a lady asks you to do things you cannot refuse.

Mr. R. Watson (Doncaster): It is with equal pleasure that I second the resolution put before you. Mr. Waddom has referred to three things which characterize Mrs. Brereton. I could refer probably to more, because, as a member of the Executive Committee, I have had ample opportunity of seeing what she is doing, what she is capable of, and what we anticipate—indeed, are sure—she will do in the future. Mrs. Brereton is probably known to the majority of the members of the Association as Editor of the "Bulletin;" but this does not convey to you exactly all that she is to the Association. In many ways she gives excellent advice, she is fertile of suggestion, and in committee and out of committee is doing a vast amount of work for our cause. We see from time to time excellent articles in the London and Provincial dailies; and in the majority, if not all, of those cases we have to thank Mrs. Brereton for the position which these articles occupy in the Press, for the extent of them, and for the character of what appears in the papers. Her pen work is known in many respects, not only in connection with gas, but in health magazines, where she is also doing useful work for us. The way the inspiriting address we had yesterday was received, shows the warm appreciation of the members of the Association of Mrs. Brereton.

The President: In putting this resolution, I must say how heartily I join in all that has been said.

The resolution was unanimously passed.

Mrs. Cloudesley Brereton: I said in Manchester a year ago that I was overwhelmed by all the kindness I received from my fellow committee-men. The appointment of a woman to such a post, extraordinary as it was considered in the first instance, and reckless as it was thought by some of the gas companies, was merely because I seemed to the minds of the Executive to embody the various attributes that were necessary at the moment for the pioneer work that was to be done. I was not appointed because I was a woman; nor does it in any way follow that my successor should be a woman. I always try to work among you on the committees, and on consulting bodies outside, as a fellow man; and I thank you that you always treat me like a man. I always try to approach subjects with a man's courtesy and tact, while bringing to my work as well something of a woman's point of view, which I hope has been of value to you in the work I have done. I thank you from the bottom of my heart for your appreciation of what I have been able to do with my whole soul and my whole strength, and sometimes far beyond my strength.

Mr. Thomas Berridge, J.P. (Leamington): I have much pleasure in moving a cordial vote of thanks to our Secretary. A great deal has been said about everybody else; but the Secretary deserves credit. He has to carry out what Mr. Goodenough suggests, and works early and late.

Mr. W. E. Price (Hampton Court): If another gentleman sitting on the platform has been described as the master-mind of this Association, I think I can but describe Mr. Mason as a master-worker. He is a zealous worker, and gives the whole of his time, and more than his time, because he gives some that his wife has a claim to, to the work of the Association. I have much pleasure in seconding the vote of thanks.

The resolution was carried unanimously.

Mr. W. M. Mason: I could not possibly be happier in the Committee I have the honour to serve, nor in the President, who is the ideal of my inspirations. In this vote of thanks my staff should have been included. No man can work without a staff; and I am most happy in mine, especially in my assistant, Mr. Walker. I thank you on their behalf and on my own.

The President: Gentlemen, the conference of 1913 is now at an end.

SOCIAL EVENTS.

After the sitting on Tuesday afternoon, the members had to make a hasty flight to their various hotels in order to dress for the evening functions, for which the large hall at the Guildhall—the walls of which have looked down upon many a scene of historic rejoicing—had, with the Art Galleries, the Council Chamber, and the ante-rooms, all been generously placed at the disposal of the Association.

THE ANNUAL DINNER.

The President (Mr. Edward Allen) was, without exception, through the whole of the sittings and functions, promptness personified. Sharp to 6.15, the time appointed, he was in the Art Galleries at the Guildhall receiving the guests—both foreign and British—and the members. It was a big gathering—the total number of guests and members greeted by the President being well over 400. As they were received, the members passed down the main stairway to the famous hall; and shortly afterwards the President, accompanied by the guests and the Executive Committee of the Association, proceeded to the hall, and to their allotted places at the tables. Meanwhile the string band of "The Rangers" (12th London Batt.), the Honorary Colonel of which is Sir Corbet Woodall, by the permission of Lieut.-Col. T. Wilton, rendered a selection of music. The programme prior to and during dinner was as follows:

1. March	..	..	"Under the Stars"	..	..	*Weiss*
2. Intermezzo	..	..	"Tales of Hofmann"	..	..	*Offenbach*
3. Selection	..	..	"Faust"	..	..	*Gounod*
4. Gavotte	..	..	"Way to the Heart"	..	..	*Lincke*
5. Entr'acte	..	..	"Madame Sheny"	..	..	*Hoschana*
6. Concert Valse	..	..	"Nights of Gladness"	..	..	*Ancliffe*

The band was under the direction of Mr. Alex. E. Bensen-Ansley.

The President (Mr. Edward Allen, M.Inst.C.E.), occupied the chair.

According to the plan of the top table, to the right of the President were: Sir Corbet Woodall, Alderman W. Penrose Green, Alderman J. H. M'Gaul, Mr. W. D. Helps, Bailie Lindsay, Bailie Montgomery, Mr. H. M. Thornton, Alderman Wilde, Herr Karl Lempelius (Germany), Mr. D. Milne Watson, M. Gaston Gautier (France), Alderman Armitage, Mr. W. Doig Gibb, Mr. A. E. Broadberry, Sig. Marcel de Jonghe (Italy), Mr. T. Waddom, de Heer O. S. Knottnerus (Holland), Mr. John Young (Hull), Mr. Y. Miura (Japan), Alderman F. Kinder, Colonel Gascoyne, Mr. J. Ferguson Bell, Dr. C. W. Kimmins, Mr. J. W. Stewart, Mr. W. B. Scandrett (New Zealand), Mr. A. P. Main, Alderman Squire Deighton, Mr. Alex. Wilson, Mr. J. W. Mackay (Shanghai), Mr. W. Whitaker, Mr. Robert Watson.

To the left-hand side of the President were: Mr. W. J. B. Tippetts, C.C., the Chairman of the Library Committee of the Corporation of the City, Mr. F. W. Goodenough, Mr. O. H. Fogg (New York), Dr. des Voeux, Mr. R. G. Shadbolt, Mr. Fred. J. West, Professor Vivian B. Lewes, Alderman Ball, Mr. J. H. Birchenough, C.M.G., Mr. H. James Yates, M. L. Busine (Belgium), Dr. Samuel Rideal, Mr. William Coward (Australia), Alderman Phillips, de Heer P. Bolsius (Holland), Alderman F. Templer Depree, Colonel H. Oakden Fisher, Alfred Docker (Australia), Mr. H. F. Andresen (Germany), Alderman Jessop, Dr. J. W. Howarth, Mr. C. E. Dovey, Mr. A. P. F. Hayman (Belgium), Mr. Walter King, Mr. John H. Terry (Australia), Mr. R. S. Gardiner (France), Mr. Thomas S. Clapham, Mr. A. J. Martin, Dr. Mason, Mr. Thomas Berridge.

It will be seen that not only were the countries of the Continent represented, but also America, Japan, Australia, and New Zealand. It was a truly international gathering. At other tables, there were also several more guests representing the gas industries of the Continent, drawn to London not only by the proceedings of the Association, but by the National Gas Exhibition and the International Sulphate of Ammonia Conference.

At the close of the dinner, the loyal toasts were first honoured.

The Lord Mayor and the Corporation of the City of London.

Sir Corbet Woodall, in submitting the toast, said in that hall and under the circumstances in which they met, it was sure to receive most enthusiastic acceptance. The generous hospitality of the City of London, which was native to the Corporation, had been enjoyed by the Association to a very exceptional degree. The beautiful Council Room had been placed at their disposal that morning, and the great and historic hall lent to them for

the evening. These were matters for which they were all devoutly thankful. This kindness was added to the obligation they had already been placed under by the Lord Mayor, who had, on two occasions within the past two or three weeks, aided them by his presence and his counsel at two functions of the greatest interest to the industry and to the Association. A good deal of criticism used to be heard of the Corporation of London. He (Sir Corbet) believed these criticisms had been less frequent of recent years. He felt assured that, when the day came for the setting up of a truly democratic state, and the institutions that they now valued, then found effete, were to be cast aside, one of the last of them to go would be the Corporation of the City of London, and the very last head that would be demanded as a sacrifice on the altar of liberty would be that of the Lord Mayor. He imagined, too, that many great captains facing deadly risks, whose thoughts turned back to home and to the future, with the alternative before them of either Westminster Abbey or the Guildhall, would almost, without exception, prefer the Guildhall. ("Hear, hear.") Speaking seriously, this hall was to him and, he thought, to most of them there, as much an epitome of English history as was Westminster Abbey. Its walls as they saw them to-night had survived the great fire of London. Here had gathered the greatest of the men who had ever outlined the story of British empire and British progress. When he looked in front of him, and saw the great names of Pitt, and Wellington, and Nelson, and knew that these men had spoken in that very hall, that here year by year gathered the best the country had in the way of statesmen and orators, that here were given forth dreams of what was to be done, and a record made of what had been done, the place was almost sacred. They were all proud of the City and its princely ways which made its hospitality welcome as that of the Royal House. Apart from this, the Corporation were the controllers of a vast amount of money; were the controllers of an immense estate. They had in their service a large army of able and capable officers. Incidentally, one might mention (he was sure this would have the cordial approval of those Continental visitors whom they were proud and pleased to see present) the incomparable police of the City of London, and their charities were equal to their hospitalities. They were all proud of the City of London; they were proud of the Lord Mayor and the Corporation; and he asked all to drink cordially to the toast it was his pleasure to submit.

Mr. W. J. B. Tippetts, C.C., in responding, said that no greater honour and responsibility could fall upon any member of the Corporation than to be asked to respond for their civic king and parliament. He appreciated the privilege. In the first place, he must be allowed to say how the Corporation welcomed the Association there that day. They were glad to see the members among them, and to do some little part in furthering the objects of the great Association. The toast was a very comprehensive one. During the year now drawing to a close, the Lord Mayor, who was very devoted and patient, had maintained the traditions of the Mayoralty in all matters; and he had ever met with the unqualified approval of his fellow-citizens. The duties of the Lord Mayor were very varied and very extensive. They were not limited to the square mile over which he ruled; they were not limited even to the Metropolis. They were hardly limited to the country. Sir David had recognized this during his year of office. There had been the magnificent efforts he had made to secure the Crystal Palace for the people; and there was the subscription that was being raised for the sufferers from the recent colliery disaster. Sir David would lay down the reins of office in a few days; and he would leave behind him a record on their roll of fame second to none.

The Institution of Gas Engineers.

Councillor G. E. Hilton (Leicester) remarked that the toast he had to propose was that of the "Institution of Gas Engineers." They found the members of this body (who were drawn not only from the British Isles, but from all parts of the world) were very assiduous in all they undertook. They who were not professional gas engineers were not allowed to attend meetings of the Institution; but they had the privilege of reading of their doings in the "Journal." What was now being done in the way of conferences between the various sections of the gas industry supplied an example that might well be followed by other industries; and he was sure this would be to the common good of all industries. But they found that there were many industrial concerns which would not be associated with other concerns in the same line of business. This is not the case in the gas industry. He coupled with the toast the name of the President of the Institution. It was a name they all revered.

The President said the honour of replying to this toast fell upon him as the President of the Institution of Gas Engineers; and, on behalf of its members, he offered sincere thanks for the good wishes that had been expressed. Reference had already been made to the relative positions of the Institution and the Association. The former was the parent of the latter; and the toast was an evidence of filial affection which was very gratifying to their old parent. Let him assure the members of the Association that the affection which was bestowed upon them when the Association was but "an infant of days" had not diminished, but was now mingled with pride as the Institution looked upon the great success of the Association. That day the Association had been released from one of the leading-strings which were considered necessary in the early days; but this action did not indicate indifference, but a feeling of confidence in the ability of the Association to walk alone. He ventured to say that future years would not weaken, but strengthen the union; and the success of one body would be the success of the other. There was a scheme in the air for federating the three gas organizations so that the great gas industry might stand before the world as a single united body. Should this be accomplished, the industry would become strong for attack and defence. "A three-fold cord, who shall break?" Might he just say that the proposed federation would not weaken but strengthen each organization. The Institution would raise its status as a professional body, the Society of British Industries as a commercial body; and the Association, as representing both bodies, would gain influence in ministering to the wants of the public. They had been greatly honoured that day by being received in the Guildhall. The parent Institution felt proud that her child had been found worthy of such honour. He thanked them all on behalf of the members of the Institution for the kind way in which the toast had been received.

The Society of British Gas Industries.

Mr. R. G. Shadbolt proposed this toast. He asked who would have had the temerity to believe that the efforts put forward in 1904 by Messrs. Clare, Glover, and Co. would have had anything like the success that had attended them. The success showed that this small party properly realized the want for some means of expressing the desires of themselves and their colleagues. They, with his friends Mr. Fred West, Mr. Broadhead, Mr. John Mackay, and others, wrought hard and wrought often, and at times against very great discouragement, and apparently irreconcilable conditions. But when men got their heads together, it was marvellous what striking results accrued. It was so in this case. The movement had made rapid strides; and it had been of great value to the industry. The Society now represented no less than 120 of the leading firms; and, during the time of the existence of the Society, they had worked and laboured under the protection and wing of many eminent men. In their Presidents, the Society had a striking roll of honour. The names included Dugald Clerk, Livesey, Newbigging, Balfour Brown, Smithells, Woodall, and Dixon. Surely if any seal were needed to give an imprimatur to the efforts of any Society, such a roll of honour as that was even more than was required. He asked those present to imagine what their present Association would have been had it not been for the co-operation and assistance of the Society of British Gas Industries. He did not say the Association would not have come into existence, but it would not have been such a powerful body as it was. The National Gas Exhibition at Shepherd's Bush could not have been promoted as it had been had it not been for the existence of the Society. All this tended to better service for the public, and to the improvement of their means and their methods. But they must not imagine they had reached the summit of organization. There was no doubt, as the President had suggested, the result of all that was being done would be coalition or else federation in some form or other. He coupled with the toast the name of the Chairman of the Council of the Society (Mr. W. D. Helps).

Mr. W. D. Helps said it gave him a great deal of pride to stand there to reply for the Society of British Gas Industries. Numerically they were a small Society; but they made up for it by brains, and by the time they had given to the work of the British Commercial Gas Association. Regarding what had been strongly hinted as to the expectations for the future, they had heard that day in the Council Chamber that it was hoped the Society would find more money during the next twelve months than they had contributed in the past. So far as the Society—it was a small Society—could contribute, they would. What they could not give in money (they were a poor body of industrial men) they would make up with brains. [Laughter.] However, the main point was that between the three Societies there was now co-operation; and they were now able to exchange views and hold consultation on broad lines for the benefit of the industry they all had at heart.

British Commercial Gas Association.

Alderman A. Ball (Nottingham), in proposing the toast of the British Commercial Gas Association, said he had been wondering why he had been called upon to submit such an important toast, seeing that the Gas Committee over whom he had been called to preside were not members of the Association. But he had watched the progress of the Association with a certain amount of pleasure and pride. It had made remarkable progress. When they considered that the Association comprised something like 77 per cent. of the capital of the gas industry, they must confess that it had quickly commanded the respect of the industry. He was at the last gathering of the Association in Manchester; and he sincerely hoped that, before the next annual meeting, the Nottingham Corporation would also be members of this important Association. Such a combination of manufacturers, producers, and distributors, if properly managed, could, he was convinced, do much good for the industry and the gas consumers in the country. He congratulated the Association upon the work accomplished, and upon the energy and determination with which it had been carried on. It ought to become one of the most prosperous and

useful in the whole country. Regarding the exhibition, he had one criticism to make. It was this: He was largely interested in the agricultural world; and he must say he was very much surprised when he looked at the Sulphate of Ammonia Committee's display of produce. His own experience in the use of sulphate of ammonia on the land had been that he had realized more than double the quantity, and certainly more than double the quality of produce. When he looked at the roots displayed at the exhibition, he was simply astonished, because it would not have been any trouble whatever to have brought much finer roots that had been produced with the use of sulphate of ammonia. It was possible to get very remarkable results. In making exhibits, they ought to obtain the best possible produce in the country. What was at the exhibition was not a credit to the sulphate of ammonia trade; and it was not by any means a fair sample of what could be obtained.

Mr. F. W. Goodenough, in replying for the Association, said he should like to answer the question which had probably been presenting itself to the minds of some of their visitors—viz., What was the Association, and why did its members ask so many distinguished men to give up their valuable leisure to come here to meet them? Was this merely a commercial organization—he was going to say a commercial dodge? Was this purely an advertising scheme? Well, while not in the least ashamed of admitting, and while making no attempt to disguise, the fact (as proclaimed in the title) that they were a "commercial" association, they claimed, and hoped not without reason, to stand upon a somewhat higher plane than that of mere money-making and commercial "push." The members of the Association, collectively, represented the public service side of a national public service that had just been celebrating its hundredth year of existence. Those engaged in the service were entrusted by Parliament with a monopoly of the supply of a particular commodity of public utility, though not, be it noted, with a monopoly of what the commodity could produce—viz., light, heat, and power. As such public servants, they regarded it as their duty to see that the public knew in every detail what service the industry was in a position to render to them—how it could help to solve public problems (such as those of smoke abatement, improved ventilation, better cooking for the working classes, &c.), domestic problems (such as the saving of labour, the increase of comfort and leisure, and the safeguarding of health); and industrial problems (such as the scientific application of illumination to the end of the prevention of accidents, and the production of a maximum of good work, the hygienic heating and ventilating of factories, and the production of power at a minimum of cost). They regarded it as being their duty, as well as conducing to their profit, to ensure that a minimum price was secured to the public through a maximum advantageous usage of the commodity they produced. They further regarded it as their duty to do everything possible to improve the organization and the execution of their service to the public. These were the reasons why, by means of the Association, they co-operated to make more widely known the utilities and advantages of gas, to discuss ways and means for improving the service to the public, and to meet (and, if possible, to inform or assist) those who were the advisors or educators of the public on matters hygienic, on questions of building construction and equipment, and on the economics of the home, the factory, and the place of business. Their ideal was to make themselves worthy trustees—"civil servants" in the best sense of the words—believing firmly that the basis of all permanent commercial achievement was good service, and that, while it was their business to achieve success, it was their first duty to deserve it. They believed that the good health and well-being of the nation and the prosperity of its basic industries (if these industries were faithfully administered in the public interest) were mutually interdependent; and that he who made the first his aim and his object would best aid in the preservation and advancement of the second. This was why he was proud to sit in the chair of the Executive of the British Commercial Gas Association, and to respond on its behalf to the toast.

The Visitors.

Mr. F. J. West remarked that such a toast as this needed no commendation. They had visitors from all parts of the world—from New Zealand, Australia, Japan, Italy, Germany, France, Holland, Belgium, Denmark, and America. To all these guests they extended a very cordial welcome. All the visitors who were guests representing British gas undertakings they also very heartily welcomed; but, on the next occasion of their meeting, they hoped to find these gentlemen included as members of the Association. With the toast he joined the names of Herr Karl Lempelius, the Director of the German Publicity Committee, and Mr. Oscar H. Fogg, Director of the National Gas Association of America. Their best wish to them that evening was that their Associations might prosper in manner comparable with the British Commercial Gas Association.

Herr Lempelius, in reply, thanked Mr. West very heartily for the kind words of welcome he had addressed to the visitors. All who were the guests of the Association were very much obliged to the members for the cordial welcome and friendly hospitality bestowed upon them. It was a great honour for him to be allowed to express his own feelings of gratitude, as well as those of the other visitors. He desired to convey to the Association the heartiest congratulations not only of the German gas propaganda centre, but also of the German Association of Gas and Water Engineers. In Germany they were accustomed to regard England as being the mother of all industry; and in visiting the splendid National Gas Exhibition, they found that England was fast advancing in the development of both gas-producing and gas-using appliances. He could say that what was shown at the exhibition, especially the gas-fires, was all a very great success. By introducing the modern type of gas-fires, they were conferring a great benefit not only on England but also on all civilized countries, and especially Germany, where the gas-fire had been practically unknown until now. In his opinion, German gas engineers should try to follow the excellent example set by their British colleagues. They saw, to their great satisfaction, that the British Commercial Gas Association were doing excellent work in popularizing gas. He esteemed it to be a great honour to be—as the "Bulletin" said—the first non-English speaking member of the Association. Once more, most hearty thanks.

Mr. Oscar H. Fogg (New York) remarked that Herr Lempelius had left very little for him to say. He was about to return to America; and he should carry away with him some very deep impressions. But the way the Association were working, the things they were doing, what they had accomplished, what they had made up their minds to accomplish—all at that moment seemed small, because there stood out in his mind the good fellowship and the kind courtesy they had extended to him. He did not include anybody specifically in this, but he included everybody generally, because he had met so many good colleagues in his journeyings in England; and he could not help feeling he was leaving behind him some excellent friends. They had all ideals; and he had set himself one. He tried to voice it at the meeting that day, but, he feared, rather unsuccessfully. When they got one of the members of the British Commercial Gas Association to the United States, he thought that they would try to convince him that they realized there that, in their profession, the thing they looked up to was greater than any boundary line that any race or nation could establish. Theirs was a great brotherhood in the gas industry, and they all prized it very much indeed. Above everything else that he had seen and heard during his visit, he prized most highly the courteous treatment that he had received. He thanked them all.

This concluded the toast list.

Lady Visitors.

While the dinner had been proceeding, Mrs. Cloudesley Brereton had been holding a reception of a number of ladies engaged in hospital, educational, factory inspection, cookery, and other work, as well as lady members of the Sanitary Institute. The ladies had been received in the Art Galleries; and they were subsequently interested members of the audience that Professor Vivian B. Lewes commanded at his popular lecture.

Professor Lewes's Lecture.

The Council Chamber was soon thronged to hear the popular Professor in one of his equally popular lectures. All wanted to be there; many there were who could not even find standing room in the chamber. The Professor was in his best form. He came down to the level of those hearers who were non-technical in gas matters; and he made his lecture bright by simple illustrative experiments and flashes of wit, which caused men to heartily unbend—even the President and Sir Corbet Woodall—and the ladies were highly delighted. The lecture sketched the progress of gas lighting and heating from the low estate of years ago to the rich efficiency of to-day; and though some present knew well the almost romantic story that was told, many there were who had never heard it before. They were interested and instructed; and if any had been retaining in their minds the reputation of gas of the olden days, and were not before cognizant of the facts of modern performances, they went away wiser than they came, and with belief in the efficiency of gas re-established. The lecture lasted only about an hour; and it passed all too quickly.

A Concert.

The Council Chamber could not accommodate all the members and guests: and the overflow found its way to the beautiful Art Galleries, where a concert had been arranged from 9 to 10.30. The artistes were: Miss Alice Baxter, Miss Alys Gear, Mr. John Booth and Mr. Norman Williams; at the piano, Mr. P. Mavor Ibbs. Those who were disappointed at not finding seats to hear Professor Lewes found their consolation in the Art Galleries and the concert.

A report of the proceedings at the luncheon, which took place on Wednesday, will be found on pp. 341-3.

PAPERS AND DISCUSSIONS.

STUDY OF PROBLEMS OF DOMESTIC ECONOMY AS A FACTOR IN SALESMANSHIP.

By Mrs. M. A. CLOUDESLEY BRERETON, M.R.San.Inst.

I want at the outset to say that, though I have been turning over my subject for nearly a year, I have written my paper under considerable pressure of work only a day or so before reading it, in spite of having tried during the whole strenuous month of August to work it in with other editorial preparations for the Centenary Congress and Exhibition.

For this reason, I have had no opportunity of discussing its points with anybody, not even with the President or the Executive Chairman. I must, therefore, be understood to present to you my own personal and individual views, and not those of the Executive Committee, or even of the Editorial Committee. I alone am responsible for my views and suggestions; and I stand up here individually as food for argumentative powder—nothing more dangerous I trust.

The Concrete and Human Aspect.

The fundamental consideration at the outset in dealing with the aspect of gas salesmanship which I hope to put before you, must, I think, be the fixing clearly in our own minds what is to be our point of view. There can, to my mind, be but one statement of the scientific view-point. We must, if we are to deal effectively with the domestic problem, with its numerous ramifications, economic, sanitary, and personal, think of our work as gas salesmen in terms of *human beings*, and not in terms of *gas appliances*. We must look outwards upon the world where our goods are to be used, and not inwards upon the works where they are manufactured. The production of gas and of gas appliances is the work of the gas engineer and the gas manufacturer. The bringing of them to full use in the service of man is the province of the gas salesman.

This very fact raises the whole status of the commercial side of any industry, and especially of an industry whose appliances are so directly bound up with personal and public health and preventive medicine, and with what the Executive Chairman, in an earlier conference, has called "preventive common sense."

Theories may do a great deal to redeem the homes of the people from dirt and disease; but *things*—even common every-day things, like fires and cookers, baths and water heaters—will do more. The concrete can be "understanded of the people," and, what is more important, can be used and handled by them. Redemption of every kind eventually comes by practice, and not by precept. And so, by means of our practical application of the scientific theories we get things done—men's homes made cleaner, women's lives made easier, and the air of our cities rendered purer.

Learn your Consumer's Problem.

In dealing with a gas problem, whatever it may be, industrial or domestic, you must be able to meet the person consulting you, prospective or actual consumer, on his own ground. In a factory or business house, you must know as much of the broad problems of the business as the head of the firm knows himself, in addition to as much of the details of that portion which is affected by the gas proposition as is known by the foreman of any particular branch—which is saying a good deal. But, further, you must know more about the possibilities of gas for that factory or business house than the managing-director and his departmental foreman put together. You may think this a rather tall order; but you are not going to get gas to be used for everything for which it might be employed for any given works, unless your head salesman does take this broad and deep view of his job.

In the case of large works, I am, of course, concerned in this paper only with the domestic problem—for example, the feeding of employees, the sanitary arrangements generally, and the washing and bathing arrangements, particularly in factories and workshops, in institutions and shops. But the same selling principle applies to the broader question of gas for industrial purposes, and should be borne in mind by all gas undertakings.

To have an engineer and manager at £1000 to £5000 a year (or whatever figure manager's and engineer's salaries rise to in this flourishing industry) and a head-salesman at £100 to £500 in the same range of gas undertakings, is what the old proverb calls "penny wise, pound foolish." In modern gas administration the commercial side should be as much respected and as well paid as the purely professional and technical side. In common with all other modern business ventures, that is the road to sound finance and successful administration.

In reference to this very high ideal of salesmanship, as applied to our own work, I may, perhaps, here be allowed to make a suggestion to the heads of the industry present. I fully appreciate the financial difficulty, in the case of smaller provincial gas undertakings, of providing the salary for a man of the type I describe. I realize the equal impossibility of adding this important and nerve-exhausting work as an extra and makeweight to the already overweighted duties of the provincial gas manager, who perhaps already combines the duties and responsibilities of manager, engineer, secretary, and a few other offices in his one energetic person. One practical solution would, I think, be co-operation in some form; and of the details of this co-operation I shall speak more fully under the head of definite recommendations at the end of my paper.

Different Problem in Different Areas.

To return for the moment to the details of the housekeeping problems which confront the outdoor representative every day, I should like to emphasize the fact that it is of no use to get up, or, as the schoolboy would say, "swot up," some one little "domestic talk," and use it indiscriminately anywhere and everywhere. It is unpractical and wanting in intelligence to use the same arguments and the same illustrations in Belgravia and Bermondsey, or in Bermondsey and Brixton. Again, it is futile to treat London and Birmingham, a fishing town and a mill district, a south-country town and a north-country town, as if the gas problem in the homes of the consumers in these widely different districts were one and the same.

I will give you a few concrete examples. First as to different classes of houses in the same town. I have taken London as typical.

In Bermondsey, you may assume at the outset that the "lady" of the house is her own maid-of-all-work, with a limited amount of money and a poor supply of this world's goods into the bargain. It is of no use therefore to discuss servant problem with her. Husband problem will be more to the point; and if you can show her how to "feed the brute" and tempt him to come home on pay day with his pockets full instead of empty, and how to clear the house of steam and soapsuds on washing day, you will have made a good start in Bermondsey domestic economy.

In Brixton, the mistress of the house may be also the maid-of-all-work, but not quite on the same lines as Bermondsey. If she is not her maid-of-all-work, she probably often wishes she were—if only she could be quit of coal-fires, coal-cellars, sweeps, and flues. To her you may talk servant problem in its acutest form—from the registry office stage to the departure of Mary Ann to a better world, where there are no scuttles to carry, and no pots and pans to break. You may even suggest "after-theatre comforts" without a maid being kept up, or without a maid to be kept up, and so on.

In Belgravia, you have to approach the mistress—if you ever reach her—*viâ* the forbidding man-servant and the gorgeous *chef*. Here you may talk servants problems, but with infinite tact and circumspection. If you are talking to the *chef*, do not suggest less staff. Let the *chef* do it, if he will—let him jump to the conclusion that it would be a good stroke of business to halve the cost of the third kitchen maid or the odd man between a slightly higher gas bill and his own salary; but do not be so unwise as to venture on the subject of reduction of staff on any floor lower than the dining room.

Even there use judgment. If you get so far as to obtain an interview with the mistress of the establishment, lay more stress on the value of gas for convenience, for comfort, for cleanliness, for preservation of precious glass, furniture, and draperies, than for the sordid reason of saving money. You may incidentally say it will be more economical in the end because of the value it gives. But in any case don't labour the economy side so much as the luxury side, unless my lady gives you a lead. Show not how gas will save servants, but how it will make contented and satisfactory

servants. The problem in such a house is not to get rid of servants, but how to keep them; not so much to save money as to get full value for it.

The "Home" and the Domestic Problem in its National Aspect.

But apart from these inner workings of individual types of home, there is the altogether broader aspect of our home life and our home-making problems—problems which are changing our Twentieth Century homes to their very foundations. Take, for example, the changing servant and service problem. This is one fraught with huge possibilities to the alert gas man. He must be alive, for instance, to the spread of intelligent teaching in domestic economy throughout civilized countries to-day, and more especially the springing-up on all sides of cookery and housewifery and laundry schools—both the private enterprises and those under education authorities; the establishment of schools for mothers, and even schools for fathers; the fast-spreading influence on the home life of our land and the far-off lands of the Boy Scout and similar movements; the popularizing of sanitary ideas and ideals in every home from the humblest to the highest; and last, but most important of all, the gradual, but none the less sure, revival of the appreciation of the dignity of household labour, however much the workman may "down tools" in the outer labour world.

The so-called "Women's" movement—which like all the unselfish enterprises of women from the world's foundation is not in its deep essentials a movement by women for women, but by women for men and for humanity—bids fair to revolutionize our home life. Do not misunderstand me. I am referring not to the political but to the social emancipation of women, and I would not for a moment have you think that I am dragging in any question of votes or no votes for women. The social and economic emancipation of women will, I believe, make our homes not less but more the true centre of woman's activity; it will give her more power in her home as well as outside her home; "Domestic Economy," that much mis-used and much abused term, will once more come into its rightful kingdom.

The educated woman who knows something of the problems and politics of the larger economic world will be better able to administer her own department, or her own "queendom," as the case may be; for it must be remembered that, married or unmarried, every woman has at some stage of her life to practise home management, either on a small and isolated scale in a single home, whether on a pound a week or a pound a minute, or else to administer a "home" on a more combined or even universal scale, as is the case of the woman who becomes head of a school, a college, a hospital, a prison, a nursing home, or other institution, or becomes in some measure responsible for many homes, or, in a broader sense still, for "Home" with a capital letter in the sense of Home-life, on a parochial, county, or national scale, by becoming a member of a parish, district, or county council, or one of the many sanitary or other public bodies which, in their measure and degree, govern the conditions of our national home life, through sanitary laws, buildings laws, and so on.

When a certain type of man talks the utter rubbish about women staying at home and minding her business or her babies, he often forgets that the modern woman, with her broader and deeper education, with her superabundant energy released, owing to modern labour-saving appliances, for more generous purposes than the treadmill scouring and scrubbing and scrubbing and scouring, day in and day out, from year end to year end, is perfectly capable of attending to her own home properly, while giving of her abundance in heart and brain to others who may profit by her knowledge and experience.

The Growing Influence of the Public-Spirited Woman.

Even thoughtful men sometimes fail to realize that the woman who does the most effective work outside her home generally also does the most effective work inside her home—partly because she learns early in her professional career, whether as doctor, writer, teacher, or business organizer, the value of delegation, and partly because she runs her own house as she runs her business or profession, on business-like lines. She may seem to the man who knows her only as a sort of "man amongst men"—hard, severe and cold, even heartless. If he is an old-fashioned man, he may even call her "unsexed"—that term beloved of the unprogressive male.

Yet, be it remembered, the man who upbraids such a woman for not stopping at home, is generally the type of husband or father who, if she did stay at home, would be sure, sooner or later, to remind her that he was earning the living, and that as he paid the piper he meant to call the tune, and perhaps to taunt her when serious matters cropped up in household economics or in respect of planting the sons and daughter, or brothers and sisters, out in the world—that she, being only a stay-at-home woman, was ignorant of the ways of the business world and must therefore leave the settlement of all weighty matters to him.

The French woman, to her everlasting glory, has never submitted to such a state of things. She always has her money-stake in the home, however small; she always understands both her own business and that of her husband; and she is always a very real force to be reckoned with, both in the home and outside it. The majority of educated women of to-day the world over have taken the law into their own hands in this matter, and have quietly, but firmly, insisted on offering the leisure gained from household work to the service of that larger household—all struggling mankind—though they have done this, not by any means always for money or wages, where money was not one of the objects for doing public work outside their own home.

What I wish to point out very clearly is that in these days of extended and extending social service, and of the growth of corporate life in almost every direction, from the feeding of school children to catering in restaurant, hotel, and club life for all classes and both sexes, the domestic problem for all traders, including gas men, does not begin and end with the individual private home.

There will, of course, always be some women whose chief and perhaps exclusive duty, owing to a variety of causes, will point to the fact that in their case home-making and housekeeping must, like charity, not only begin at home, but end there—must, in fact, be practically confined to their own four walls. To them, for the great sacrifice that it means in many cases to circumscribe their own lives for the sake of those they love, England owes a debt which must for ever remain unpaid. For it is to such devoted women, in the first instance, that we owe not only the reality, but even the word which is so distinctively English—the word "Home." To them, moreover, we owe our increasing national desire to raise the standard of home life everywhere. These wives and mothers first and foremost are the women who have made us really take to heart the housing problem and many other problems, because we are led to compare their peaceful and blissful home life with that which consists in having a place to dwell in, which cannot by any stretch of imagination be dignified by the name of home.

The woman—she is in a minority—who can really and truly afford in these days simply to stay at home, and do nothing but care for and help and nurture and inspire one man and his immediate circle, has had her personal problem solved by the enterprise of the gas man with his cooking and heating appliances. Most of us would like to be in similar circumstances when married, if only we had the means, and, what is more important, if we could be assured that every other woman was so fortunate as to be able to afford to do it too. But most of us will have to wait for Heaven for that consummation; because, even if we are happy and shielded and sheltered ourselves, we hear the appealing cry of our struggling and unsheltered sisters, and even at the expense of ourselves and of the husbands and sons we love, we must divide ourselves and our energies between the inner and the outer home. The cry of the children, if not the cry of our overworked sisters, rouses us from any delusive domestic peace that we might be otherwise enjoying.

Those of us who can do our public work all for love are doubly blessed in our giving. Those of us who have to do it partly for the sake of money have to stand the chance of seeming hard, sometimes even in our own home and to those for whom we fight and struggle. But if we keep our softness and our sentiment for our own babies and our own fireside, and stand firm and strong side by side with men in the business world, I think I can say from experience that there is nothing makes a son worship his mother more than to see her looked up to and consulted as an equal by the men he respects and fears, and nothing that can make her daughter less in danger of cheapening herself or throwing herself away on an unworthy or second-rate man. A great portion

of the "woman" question will, I feel sure, be solved by the wage-earning educated mother if she will but see to it that her war for her children binds her to them rather than divides her from them.

The Vital Connection between Sociology and Salesmanship.

You will perhaps think that this broad economic and psychological point of view has little to do with gas salesmanship and the domestic problem, and that it is therefore out of the picture in such a paper as mine with its humble title. I want to try to show you, on the contrary, that it is of the very essence of the domestic problem to both the gas manufacturer and the gas manager. It is part of the almost —not quite—*silent* force which is moving to a domestic *revolution*, or—if wisely handled by statesmen on the one hand and by thoughtful women on the other—to a great domestic *evolution* in the immediate future.

You will remember that one of our greatest poets writing of Woman in the Home emphasizes the existence of a side of woman often forgotten by the man who looks upon her as specially created to be the servant and drudge of man—a creature who was an afterthought of a considerate and wise Power, Who decided that man must have somebody besides the beasts of the field to bear his burdens.

Wordsworth, in those words which we all learn as school girls, even if we never become quite familiar with much else written by the Bard of Rydal Mount, said of her whom he called "The Angel in the House"—

> "I saw her upon nearer view
> A Spirit yet a *Woman* too. . . ."

Now it is this spiritual side of woman, crushed down by her natural conscientiousness—a conscientiousness carried to a fault in house-keeping and house-cleaning—that the modern labour-saving appliance may in its measure and degree restore. It will make woman's physical labour less, and in addition make lighter the physical labour which must remain to be done in a work-a-day world. Every man will own that woman's inherent thoroughness will tempt her to make a galley-slave of herself, if no easy method of being perfectly clean is to hand. But with higher education and opportunities for broader outlook (owing partly to the business life of girls before marriage and the consequent economic independence) there is a growing desire to develop what Wordsworth called the angelic, what we may call in less idealistic language, the intellectual and spiritual side of womanhood.

To this end, she will hold out both her hands eagerly to anyone who can offer her some labour-saving device which will help her to keep health, youth, and beauty. It may be washable paint for the drawing-room in place of rough paper; linoleum for the kitchen instead of porous boards; enamelled fire-places instead of the black-leaded variety; aluminium saucepans for burnished copper; the gas-fire, gas-cooker, and gas water-heater for the old cumbrous coal range. She will see that by this means she may hope to keep up her standard of cleanliness and still expend less human energy in rough work, with the net result of more health, a longer, happier, and more æsthetic life, more leisure for seeing something of the larger world, and so bursting her domestic prison bars and making her house a home.

But any such device must fulfil three essentials: Give the same thorough household results as older and more cumbersome utensils; cost no more, if cost be reckoned all-round on a broad and economic basis; and liberate some of the precious time hitherto spent in drudgery—repetitive and soul-killing drudgery—for the development of that intellectual and spiritual side which has hitherto in the case of the work-a-day woman, servant and mistress alike, been almost smothered after taking up housekeeping duties and responsibilities.

We must bear in mind, as a business axiom, in dealing with the domestic problem, that in the case of a woman who gives up wage-earning in the open market for that great unpaid profession of wifehood and motherhood, she has often but one economic asset left—her health; and, bound up with her health and physical fitness, her beauty. If we can help her to retain that priceless asset, she will be ready and eager to listen to our business arguments.

The awakening of women to their power in home life is going to be a force which will make it necessary for the gas salesman—and I here use "salesman" in the widest sense of which it is capable—to think of his gas appliances not in hundreds but in millions, and not to think in millions in his own country only, but to think on broader lines and to cast his thoughts (especially in the case of the gas appliance manufacturer) beyond the shores of these isles to the outer worlds waiting to be conquered and to be served. To use a well-worn political phrase, the B.C.G.A. man must learn "to think Imperially" in business matters; for remember Britain includes Britain beyond the seas, and we, who were the pioneers, should put no bounds to the Association's work, now we number within our ranks, as well as representatives of our foreign and friendly neighbours, so many Associations from the Overseas Dominions.

The Administrative Lesson of the Larger View.

The important salesmanship point in this larger and loftier view of the domestic problem can, however, be summed up in a few words. The ordinary type of young shop assistant, with a shop assistant's wages, armed only with the budding shop assistant's youth, charm, and good intentions, and a shop assistant's outlook generally, with perhaps some superficial salesmanship knowledge in which there is a modicum of gas engineering, book-keeping, shorthand, typewriting, letter writing, and so on, is the wrong person, because he is the inadequately trained, insufficiently experienced, imperfectly educated person, to deal with these larger economic problems, with women doctors, women councillors, and women workers generally, or to deal with them in a correspondingly satisfactory manner with their men co-workers, either in their public or private capacity.

These men and women must be met by gas officials, whether men or women, who can discuss matters with them on their own plane. It is not the fault of the young man at £100 or £200 a year that he has not the broad outlook, the wide education, and the far-reaching imagination of the man who can command ten times his salary. If you pay £100 a year, you may expect to get a hundred pounds' worth of quality and quantity of work; neither more nor less. It is unsound finance if you do. If the man is worth less, he ought to be disrated or sacked; if he is worth more, he ought to be paid more or to sack you. From what I know of the gas industry, you will probably get more than £100 worth of devotion and loyalty for your £100; but then that is a commodity which can never be bought or sold.

The Man for the Work.

The fact remains that the job I have outlined is the job of a man of affairs—a really big man. And here I know I shall be met, even by those who agree with me in principle —and I trust some do—with the objection that, granting that such a method of procedure were desirable, the majority of works could not afford to retain, say, a Dr. Rideal or a Professor Vivian Lewes as consultant and adviser to the more important customers, or possible customers, in the immediate district. But there is more than one way of paying and retaining such a man. One way would be, of course, to have such a man, or staff of men, at the Central B.C.G.A. Offices. Another would be to have one such man available in each district—say half-a-dozen men for the whole country—each district salesman-in-chief either giving his whole time to the industry or a proportion of his time while running an ordinary consulting or other practice.

Another method, which is of the nature of a combination of both—and we English love compromise—would be to have in London a consulting salesman of standing and reputation, a man above any sort of temptation to fear or favour individual makers, a man who knew a great deal about manufacture of gas and gas appliances, of engineering, and of distribution and salesmanship, and who was of sufficient social standing to deal with the problem of the mansion or the cottage, the large institution or the small school or nursing home—one who could equally well enter into the problems of a man about to plan a town, and the anxieties of a poor woman who wondered if she could afford to hire a gas cooker.

Perhaps the best solution—at any rate in the early stages —would be one such good man at Victoria Street, to relieve the overburdened Secretary of much that is not properly a Secretary's work, and an assistant under him who might have his headquarters in London, but might be a peripatetic person, acting under his chief, as a travelling adviser to the various gas-works throughout the kingdom, and engaged for a few weeks at a time perhaps in different districts in the

country to interview (as from the London and local office combined) the public men and women in the respective localities. Meetings might even be arranged and discussions take place in some cases, so that the public men would come to the consultant instead of the consultant going to them, somewhat on the lines of the conferences at the exhibition, as a means of getting the right people to the gas show-room, town hall, or other meeting place in the provinces.

I believe that such a man, if he had the proper social status and the proper University degrees—I attach great importance to both—with, of course, a thorough grasp of the social and economic side of the gas campaign problem, would be accepted and trusted by the business and professional and other public men, now that the Association and the Centenary Gas Committee have clearly proved to the public that, while we are not disinterested philanthropists, we are, at any rate, keenly alive to our responsibilities in the Public Health Campaign, and are not merely a group of sordid tradesmen selling a sort of patent medicine indiscriminately, without caring whether it kills or cures, so long as there are plenty more live folk left to buy.

Some Definite Recommendations.

I would like to sum up briefly a few practical recommendations which would, in my opinion, help towards the solution of this question of bringing our salesmanship side into living touch with the domestic problems of our day and generation, which would help us, in fact, to do more than this—to *anticipate* the domestic problems that arise, or are likely to arise, in order that we may not merely try to deal with existing problems, but may lead instead of follow public opinion.

First, of course, I would put the idea already outlined of a Consulting Salesmanship Department in connection with the Association, with a central office in London, but having active provincial ramifications. The following suggestions may also be useful; and though few undertakings would be likely to take them in their entirety, one or more might provide for a forward step in the direction I have indicated in my paper, if it were chosen according to local needs and local possibilities.

I.—Gas managers, engineers, and perhaps, on special occasions, enthusiastic directors, might with advantage meet more often with those employees who come into direct contact with the general public. These men, with the addition from time to time of lady advisers or other qualified women, might either give lectures on the broader problems which affect the industry or merely start discussions on set topics, which would afford the men the opportunity and the courage of giving their views and their experiences in dealing with the concrete problems which crop up day by day with the outdoor staff. The busy managers or the exalted Board of Directors may perhaps, amid the stress of their own absorbing business, forget how circumscribed the lives and experiences of some of the young salesmen necessarily are, and that they themselves have opportunities of being in touch with the bigger world of affairs which the subordinates have not.

Yet good intentions on the part of the men unfortified by knowledge can never bring about sound, commercial results; and it is nothing short of a duty for the bigger men in the industry to share their broader and wider knowledge, and to give the benefit of their own larger horizon to those younger men, who are often the only men by whom the public can judge the industry. What should we say of a foreign nation that sent to us an ambassador without giving him any of the advantages of training, or education, or any opportunity for widening his horizon? Yet these younger men, frequently with tremendous handicaps, are "ambassadors" to the outside public.

II.—My first recommendations deal with meetings to discuss gas problems from a wide standpoint; the second suggestion I want to make is perhaps hardly less important. It is that gas men in conference should not always talk gas; but that periodical meetings should be held deliberately and definitely to discuss outside subjects, from the hundreds of points of view which might not, at first sight, seem to bear on the gas problem, but which are, if properly understood, of even more importance to a chief salesman than are the details of the latest kind of stove or the last laboratory experiment, though I would not like it to be thought that I underrate for one moment the importance of a salesman understanding his gas details down to the smallest piece of mechanism, or of knowing that most difficult of all things—what he does *not* know—and therefore appreciating when and where to call in the expert, even if that expert be but the foreman fitter.

I can speak with authority on this point of getting outside gas at meetings of gas men, from my own intimate knowledge of my relations with the gas industry. For if there is anything upon which I can definitely put my finger, and say that I have contributed something new and original to the present usefulness, and the possibility of future usefulness, of the industry, I should say that it is not so much in giving the woman's point of view to certain departments—for well-educated lady advisers, if their scope of work were enlarged throughout the country, might do that satisfactorily; not in providing an editorial department of some magnitude, properly co-ordinated on the editorial side with the lay Press, and on the business side with our own excellent publicity department—for a man with a sound knowledge of press matters, assisted by trained women with a knowledge of household economics, might have organized that side as well as, or better than, I; but the fundamental service which I hope I have been able to render to the industry has, to my own critical mind, appeared to lie chiefly in the direction of bringing the views and opinions of the man of the world—the non-gas man, that is—to bear upon the problems of gas salesmanship. That I have been able to combine in my own person the woman's point of view on domestic and social problems; a long practical educational experience; a knowledge of the broader medical and sanitary principles; some skill in writing, editing, and organizing; this combination is just a fortunate accident. It is, I believe, moreover, a combination which may, in years to come, be necessary, though on a more complete and perfect scale, and in the several persons of one or more men and women trained in domestic and social economy; a medical man and medical woman; an educational man and woman; a school and a hospital architect; a newspaper expert; and probably many others, as the Association rises to its fuller possibilities in public usefulness, and as salesmanship, in its highest sense, is appreciated, not only in the gas industry but in all industries, as the dignified form of public service, which it undoubtedly will be in the days of our children and children's children.

This body of people may probably be, and probably act, only as an advisory committee of the Association. But that such a committee will eventually exist I feel sure, as the Association comes to be co-ordinated as well as extended; for I look upon the British Commercial Gas Association as still only in its infancy.

III.—I would strongly urge that gas managers, gas directors, and other prominent men in every undertaking should belong to societies other than professional ones connected with gas. And this for two reasons: First, so that leaders in the industry may be able to influence the corporate opinion of such societies, as members and not as outsiders; and, secondly, in order that the societies may be able to influence the gas members by bringing them into touch with other learned or social groups of public people; and further under the second head, that, through these actual members who are also gas men, the younger gas salesmen may receive the benefit of the membership of their chiefs. Among such societies, as affecting the domestic problem, may be mentioned: The Smoke Abatement Society, the Royal Sanitary Institute, the Institute of Hygiene, the Royal Institute of Public Health, the Child Study Society, the Parents National Education Union, the Eugenics Education Society, and many others which will occur to the man of the world.

IV.—My fourth recommendation is directed towards bringing the right kind of literature on broader problems before the younger men, and those who cannot be expected to pay for expensive books, expensive periodicals, or expensive membership of learned societies, however useful and desirable. To this end one or two suggestions, among many that might be made, may be useful.

1. Reports should be made from time to time, say quarterly, to the men at smoking concerts or other social gatherings (in consideration of the fact that they are all tired men already fully occupied) of any subjects dealt with at conferences, whether national or international, on educational, sanitary, or other matters. These reports would of necessity need to be made by a man who knew both his gas side and his public side sufficiently well to make them of real practical value to those who

would listen to them, and who would think of them very largely, at any rate at first, only from the gas standpoint. A "scissors-and-paste" procedure, quickly and carelessly done after the manner of the tit-bit method of modern education, which ends in giving men a smattering of information and raising a crew of half-educated prigs, would be better left undone.

But when it is considered that several hundred conferences of real value for some portion of the nation are held in London alone every year, it stands to reason that sufficient subjects of direct interest to the gas man with imagination must be discussed to make a quarterly meeting, properly handled, of real practical value.

The printed official reports of such conferences—published afterwards by the respective societies—would at any rate be valuable to the central office and to any district salesmanship department which might be formed, even if merely blue pencilled by an experienced man, provided a card index were kept of those subjects to which gas managers and gas salesmen might with advantage refer when preparing speeches or making practical experiments.

2. A small reference library on domestic problems might with advantage be started for the use of every undertaking however small. In this library I would suggest the following as a start:—

(*a*) A bound copy of the domestic pamphlets of the British Commercial Gas Association, similar to the complete set already sent out by the Secretary, but embracing only the domestic pamphlets. These give a very good start to the young salesman in understanding the many different domestic problems which have to be faced, and will keep him from making some of the more glaring errors outlined in the early part of my paper, in treating the domestic problem as if it were one for all classes of home and for every geographical area. They will make up to him what travel supplies to the man who can see many countries, for any lack of knowledge of more than one type of household and one type of house-keeping problem. They have the advantage that they are written solely from the gas point of view, and that, besides touching many types of home, they also cover the different gas problems—gas heating, gas cooking, gas lighting, and that very complex problem—modern gas water-heating. These should, however, be supplemented by:

(*b*) A few good books on household administration, practical hygiene, and simple domestic economy.

(*c*) Periodicals taken regularly for the library, such as "Education," "Public Health," one hospital paper, "School Hygiene," "The Child," and perhaps some women's papers, such as "The Mother and the Baby's World," "The Baby," "The Matron," "The Queen," "The Lady," and so on, if these latter can be afforded.

(*d*) Annual or other reports and regulations of various authorities—*e.g.*, the Board of Education, the London County Council, other County Councils, &c. If the industrial aspect is added to these, many others will, of course, be needed.

e) A press-cutting book of references from daily and other newspapers all over the country, which make reference to domestic problems of heating, lighting, cooking, ventilation, water-heating, and perhaps domestic architecture (whether they mention gas or not) should be kept, and press cuttings taken from a reliable agency. This book should be kept in an easily accessible place for the use of the salesmanship department. It may be well here to suggest that the whole staff (including even the labouring men) should be encouraged to bring matter from their own newspapers, which might very easily have escaped the ordinary press-cutting agency, and that prizes should be given at the end of the year to those who have brought the cuttings which might seem to indicate the greatest discrimination in reading their daily papers and the liveliest interest in the work they do.

(*f*) Every gas manager should keep a vigilant eye on the women's columns of the daily papers in their own district, as well as in the general press; and not omit the women's and the medical papers when they are making up their scheme of advertising.

I have spoken of a small library of domestic economy and other books for the selling staff. I do not suggest that these should be a substitute for the careful reading of your weekly and monthly gas papers. Those every gas man must, of course, read and digest. The library of domestic (and I would like to add industrial) economy should be in addition to your purely technical and professional reading. For a five-pound note, I would fit up a library which would make a good nucleus at any rate for such a purpose from the domestic standpoint. A small yearly sum—say, £5—would secure the addition of, say, £2 for books and £3 for the more important periodicals such as I have mentioned being added year by year; and in a few years a really useful set of books would be at the disposal of the men. You and your staff may read them only to disagree with them. There is no finality and certainty; there is no infallibility in the printed word.

I do not suggest that you should swallow whole all you read even in a newspaper, much less in a school text-book; but you will at least see the subjects which are being considered under the broad term domestic economy, and you will get an idea how they are being taught and handled. You will see the point of view of the school teacher, the school committee, and, moreover, the woman's and home-maker's point of view generally. And you will be able to do this in a more complete co-related and co-ordinated manner than if you just "pick-up" your domestic lore from isolated and chance discussions with your immediate circle of women friends, whose outlook on domestic problems must as a rule, unless they are students of domestic economics, be a limited and circumscribed view.

The Commercial Value of broadening the Salesman's Horizon.

One of the most notable characteristics of our day is the application of scientific method to all work, however apparently humble; and the great industry which we serve, associated as it is with many branches of science, should, I think, increasingly apply scientific methods to the training of its staff on the selling side. These are the men who represent the industry to the public, the men by whom the public judge the industry and its methods, and the men on whom very largely the gas undertakings depend for the success in bringing all they can offer to those for whom, after all, it is manufactured. You may make the most perfect gas and produce it as cheaply as you can desire owing to scientific methods in the works; you may design and make the most efficient and artistic fires, cookers, and water-heaters in your factories; on the other side—the side of the buying public—there may be an urgent need for this gaseous fuel and these appliances in which to burn it. But one more piece of machinery is needed: A body of trained men and women who know both the individual applications and appliances for gas fuel on the one hand, and the individual needs—not merely the needs in bulk—of the consuming public on the other, and can diagnose each case on its merits and prescribe the correct solution for each domestic problem.

Perhaps the situation may be compared to a mighty steam-engine ready for use and full steam ahead and a set of coaches fully loaded with human freight waiting to be taken to their destination. You may let them remain at the departure platform till doomsday if you don't set the engine moving; but you must do something of great importance before you let your engine steam out of the station if you want the engine to earn its dividends on the one hand, and the passengers to get taken to their destination on the other—you must couple your engine to the coaches.

Now, the salesmanship department of the industry is in many essential respects this coupling machinery. It cannot be too strong nor too carefully designed to keep coaches and engine together. The railway engine is not merely built to be a beautiful, but unproductive, piece of machinery to stand in a station or a museum for the diversion of an admiring public; gas-works are not built to demonstrate that laboratories or retorts can turn out perfect gas; factories are not built and maintained to prove that gas-fires can be made merely. Railway engines, gas-works, and gas appliance factories are one and all built and kept going in order to

take the public somewhere. And all three need coupling up scientifically and effectually with the public which they desire to take along the lines of progress.

THE RESPONSIBILITY OF THOSE IN AUTHORITY.

As I said at the outset of this section, the knowledge of the intricacies of the relation between the multifarious needs of a fast-growing public who do use gas, and a much larger public who might use gas even for domestic purposes exclusively, can only be mastered by a liberal education not merely from text-books, but from periodicals, from the newspapers, and from the proceedings of public bodies who are considering the hundred and one aspects of our growing and changing domestic conditions. I therefore appeal to gas managers and others to give their men liberal opportunities for studying the standpoint of the man and woman in the street, and to consider any money or time devoted to the education of their staff—using education in the broadest sense—to be money and time well spent.

I have tried to put before you one department in which I consider, in the immediate future, the Gas Industry, and more especially the Association, may extend its scope and its practical usefulness. This Association, and any other association of men of business and men of affairs, must grow or must decay. In growing it may, of course, change—change almost out of all recognition. The magic letters "B.C.G.A." may be as ancient hieroglyphics to posterity. But the work started by an Association of men of business, under the spell of the man who has been its practical originator and prime source of imagination, its chief dreamer as well as its chief doer, and the hardest worker of us all in its two years of success and usefulness, will go on for the true advancement of science in one of its most necessary and practical applications—the improvement of the domestic conditions of the people of our land—if we will but train our salesmen to appreciate the magnitude and the almost endless possibilities of the work they have undertaken.

Discussion.

The PRESIDENT (Mr. Edward Allen): Gentlemen,—We have just listened to an extremely valuable paper, which I have heard said, earlier in the meeting, we can take away with us as a standard for future guidance. I am rather glad that I had not time to read the paper before coming to the meeting. There is such a thing as taking a paper as read; but if to-day we had taken this paper as read, we should, I am sure, have missed a very great treat indeed. Mrs. Brereton has had large experience, not only among consumers, but also among gas salesmen, and has placed us under a great debt of gratitude to-day. I am going to ask Mr. Milne Watson to propose a vote of thanks, which will be seconded by Mr. Douglas Helps.

Mr. D. MILNE WATSON (London): Mr. President and gentlemen,—I am very glad indeed to have this opportunity of moving a vote of thanks to Mrs. Cloudesley Brereton for the most interesting, suggestive, and very amusing paper she has just read to us. I am sure Mrs. Cloudesley Brereton has placed us under a great debt of gratitude, not only for this paper, but as Editor of the "Bulletin," and for the work she has done for the exhibition, where she has laboured like a veritable Hercules. I believe there is no female deity to whom I could liken her. We have listened to an appeal for an improvement in the status of women; and I am sure that we are now all on the side of the angels. I cannot sit down without saying how much I appreciate the practical suggestions that have been made. We may not agree with all of them; but, at any rate, the paper has given us plenty of material to think over. There is material in the paper for many hours of study, because Mrs. Brereton has touched on the whole question of the relationship of the manager to the man, and the directors to the whole undertaking and the men and women of the world outside. As to the suggestions that she has made, while they are very useful, it may not be quite possible for a company to carry out all of them; but, still, there are many it would be well to adopt. In my own Company, we have already done something in this direction; but there is much left to be done. I am sure we are all much indebted to Mrs. Cloudesley Brereton for coming to-day, in the midst of her busy work at the exhibition, to give us of her best, and for pointing out to us how further to satisfy the consumer.

Mr. DOUGLAS H. HELPS (Reading): I have much pleasure, gentlemen, in seconding the vote of thanks to Mrs. Brereton for her interesting paper. There is no doubt that this lady possessed very special gifts and qualifications long before she came to us. When she first came to us, I do not think she knew a great deal about our industry; but in this was her great value, because she looked upon us from the outside. She has told us in her paper to-day, and on other occasions, many ways in which we can improve the position of our great industry. Now Mrs. Brereton is even more valuable to us, because, whereas when she first came she looked upon us from the outside, now she looks upon us from the inside. I have the greatest pleasure in seconding the vote of thanks.

The resolution having been carried by acclamation,

Mrs. CLOUDESLEY BRERETON said: Mr. President and fellow-workers,—I thank you cordially for the way in which you have listened to a very long paper, and for the kind remarks you have made at the end of it. I think what Mr. Helps has said was perfectly true—viz., that I did at first look upon you from the outside, and now I look at you from the inside. I thank Mr. Milne Watson for saying that I give you of my best. That I do. I would qualify somewhat what Mr. Helps has remarked, by saying that I do practise what I have been preaching to you to-day. I am not, and I never will become, a gas official. That is why I have kept absolutely my independent editorial position, and, at the same time, have kept up my editorial work on education and my other consulting work, because I feel, whether it kills me or not, that I do not mind dying quickly if I am able to achieve the end I have in view. I feel that it has been far more to the advantage of the public for me not to be flaming gas always, but for me still to be a prominent member of the Royal Institute of Public Health, and of the various national health societies of which I am an active member, and also to keep in touch with the educational world as an independent woman. In continuing to do this, I think I shall be of more value to you than if I devoted my energies exclusively to the gas industry. That is what I want you big gas men to understand—that you have a life outside your industry. I want you to share that life outside your gas industry with your young salesmen; and if you do this, you will reap an enormous harvest, because you will relieve much of the industrial unrest that there is, and make the young men not mere mechanical craftsmen, but men who love the work for its own sake.

The conference then adjourned for luncheon, and on resuming,

The PRESIDENT said: Gentlemen,—I am quite sure that, though you may have enjoyed your luncheon, you have not yet forgotten the delightful flavour that was left on your palate after hearing Mrs. Brereton's paper. I want to bring you to that point again. The discussion on the paper will now be opened by Alderman Phillips, of Salford; and then I trust there will be no hesitation on the part of those gentlemen who wish to speak on it, though I realize that they may have a very difficult task to do otherwise than pay compliments.

Alderman F. S. PHILLIPS, J.P. (Salford): Mr. President,—I feel that, upon this occasion, I am somewhat in the position of one upon whom some amount of greatness is thrust, which he has not sought. To endeavour, at short notice, to assimilate a paper of the remarkable character that we have heard this morning, which has covered so much ground, and which has presented to us so many suggestions, is almost more than one can be expected to do. I feel a little like Thackeray tells you he felt when he first visited America, and was shown there one of the native oysters which I am given to understand are very large in size. He looked at it helplessly, and said to one of his friends: "Now, what am I to do?" Though a great deal of ground has been traversed by the paper, the outstanding feature that it contains, to my mind, is the very useful and very practical suggestion that in our staffs of salesmen, and the men who are traversing the various districts, something like organization and training, with a view to a higher and better state of things than has existed hitherto, has now become an inevitable necessity. ["Hear, hear."] But even then, I am afraid I cannot hope, with Mrs. Brereton, that they will

become all that she describes them. I do not think any gas undertaking would be capable of employing men who had all the qualifications that she has given to them in the earlier part of her paper. For instance, if whenever they approach a manufacturer they are expected to know more about his business than he knows himself, and they are also to have a current knowledge of gas and its appliances—that is a condition of things that we can scarcely hope to realize, though we may usefully try to get on the way to it. I also like the suggestion that the Committee of the Association should consider the appointment of a consulting expert upon these matters, because there is no doubt that a great deal of this information, if it can be obtained from some authoritative source, will do a vast deal towards further increasing the usefulness of this young but very successful and most useful Association. From those points of view, therefore, I see a great deal in the paper which is matter for earnest consideration. But my native cautiousness prevents me travelling very far from this position. I would like to think over, and would like to read again, the various suggestions from the different points of view which Mrs. Brereton has put before us. With regard to the mutual relationship of man and woman, part of the ground that she has covered—well, when the woman gets to that extraordinary beatific state of perfection which she has indicated, we shall all be very happy, if we happen to be here. The suggestions in the paper are, on the whole, exceedingly good; and I must congratulate Mrs. Brereton on the amount of thought and care that, in her busy life—and I well know how busy she is—she has been able to put together in such a paper as this for discussion here to-day. I am going to conclude, as I began, by saying that I think it is a paper that will go throughout the length and breadth of the land, and I hope that it will receive from many undertakings the fullest possible consideration. I expect to benefit from it in our own district, and I think it is capable of conferring a very great benefit on many of our undertakings. I hope it will be fully considered, and am quite sure that the results which will come from that consideration will be exceedingly useful to us all. [Applause.]

Mr. R. W. Edwards (Aldershot): Mr. President,—The paper that we have just listened to is one that I am sure will appeal to us all in the same spirit. It is the essence of imagination. Imagination is what we get practical things from eventually. As the paper was read this morning, it appeared to me much as if we had arrived at the second stage of our meeting—that is to say, that the Association was about to emerge from the chrysalis stage. If I may for a moment hark-back to a paper that was read in 1908 in Dublin, that paper, I believe I am right in saying, was the original idea of the British Commercial Gas Association. From that paper we all of us received thoughts on the lines we were to work on in future. To-day we have had an advanced edition of the paper. It takes us, many of you may think, far beyond our ordinary vision. There are many points in the paper which I believe some of us will scarcely have realized. At the same time, I feel quite sure that we should do no harm in aiming at these ideals, and that in so doing we shall achieve a considerable measure of success in our business. We must, of course, always remember that practicability must govern our actions, after all is said and done. After we have served the consumer to the best of our ability, we must not forget the interests of our shareholders. Some of the suggestions of Mrs. Brereton, I am afraid, would encroach on the preserves which are rightly belonging to the shareholder for his dividend at the end of the year. As a philosopher once said, "Dreams in which we sleep the deepest come when we feel ourselves most awake." I daresay a good many of us in the last five years have, to take the reverse of the quotation, felt ourselves most awake when we were most asleep.

I believe many here have not fully grasped the advantages of the ramifications of the British Commercial Gas Association. A year ago, when we met in Manchester, I had the pleasure of writing a few lines to our Technical Journal; and I emphasized the great importance, not quite in the same language as Mrs. Brereton has done, of the Association appointing an expert and suitable representative whom the different subscribers could call upon to assist them in their special necessities. I have in my mind districts of varying characteristics—that is to say, districts in one statutory area where the same treatment would not be by any means applicable all over it. If you take a very high-class residential district which I have in mind, what Mrs. Brereton tells is perfectly true. You can never get past the gold-laced or important high-class servant. What are we to do? How are we to get to the mistress? How are we to get our gas introduced or adopted in such houses? These are questions that cannot be answered to-day. They are matters for consideration. I believe, as time goes on, we shall, by the aid of these specially-trained representatives and experts, be able to reach all these high-class consumers, and that the ladies whom we can get to will give ear to these particular representatives, which will ultimately lead to good business. Then, again, what did appeal to me in the paper was this: Mrs. Brereton very rightly suggests that we do not take enough interest in the welfare of those men who go about day by day carrying out the ordinary duties of gas-fitters and inspectors. Let us, for a moment, consider this point. These men are only educated a little beyond their present occupation. When they go into the different houses, a stray word may be uttered in conversation as the man is passing through the house. The lady of the house may wish him "Good morning;" and then for a moment he may hesitate, and say: "By the way," so and so. She finds that the ordinary fitter is an intelligent representative of the gas industry; and the opportunity is taken advantage of. She finds that she has a man to deal with who is intelligent, who is able to tell her something that she probably never knew before, or, if she has known it, her knowledge was imperfect; and this leads on to business, or quite probably it means that the lady then goes to the local show-room. Now, at the local show-room you do not want the ordinary attendant. You need an educated, intelligent servant. You want someone who can pick up the threads that were only partially sewn by the casual conversation in the house, and so on. I can quite well follow Mrs. Brereton in her paper, though I think she has taken us a little beyond our plane to-day. But I do say this—that we shall rise to the occasion, we shall aim at these ideals, just in the same way as the paper that was read in 1907 has brought us here to this meeting. And so, when another five years have elapsed, we shall, I believe, find ourselves in a different position. We shall find that the Association has passed from the chrysalis stage, and has become a full-blown Association, and that we shall have attained a good many of the ideals which have been so well set out in the paper we have had such pleasure in hearing this morning. [Applause.]

The President: The Chairman of the Executive Committee suggests to me that the absence of further observations may be taken as complimentary to the paper. I quite agree with him; but, at the same time, we do not want to proceed to the next business without giving everyone who desires it an opportunity of speaking.

Alderman W. Armitage, J.P. (Doncaster): Mr. President,—It is exceedingly difficult to discuss a paper of the nature of the one to which we have had the privilege of listening. Mrs. Brereton has covered the whole ground so thoroughly. She has traversed from Dan to Beersheeba—if one might use such an old theological phrase—and has given us so much to think about that I am afraid the discussion might be of a somewhat abortive character. At the same time, though we were told that it had been written under durance vile, and suchlike disadvantageous circumstances, it has been a marvel to me how such a paper could have been prepared. Talk about perils by sea and land, perils among false brethren, and so forth! I think St. Paul was not equal to it. My own impression (and I have breathed it gently to Alderman Phillips on my right, with whom I am well acquainted, and I must not breathe it more than gently here) is that, if only one-half of the paper is carried out, I think we shall have accomplished something. At least, I myself, who have come from Yorkshire, where we think we know everything, and that wisdom will die with us (of course, I do not say that Yorkshire is before Lancashire), have been amazed at the paper to which we have had the privilege of listening this morning. I am the Chairman of a Gas Committee. Sometimes they say I am an ideal chairman in that sense. I do not know whether it is a kind of *double entendre*. But the thing that ran through my mind, being a tradesman, is this: Take any given street—such as Cheapside, or any street in London or in Manchester—how is it that No. 25 goes up and makes a fortune, while No. 24, the very next door, in similar circumstances, with a similar shop front, similar apparent energy, similar

attractiveness on the part of the shopkeeper, ends in failure? One makes a fortune, and becomes Lord Mayor. With regard to the other poor man, there is never anything in him; he makes nothing, and ends in the Bankruptcy Court. Now, if you solve this problem, you solve the problem of Mrs. Brereton's paper—namely, that it is the shopkeeper who makes more than the shop who sends up his business. This was to a large extent the thought that was running through Mrs. Brereton's paper, and there is, I think, philosophy in it. I have known many men in my time in West Yorkshire who started business under equal circumstances and with a good send-off but who have done no good, while others have come and occupied the next door premises and beaten them into a cocked hat. I have come to the conclusion that it is the man largely who makes the business, and that the shop is quite a second or third rate affair.

Now, Mrs. Brereton's paper was a lesson for this Association, which is foregathering under such brilliant circumstances on this occasion in the City of London. Where are we to-day? Is not this the centre of sweetness and light? Is not this the centre of the activities of Sir Richard Whittington? Where did he come from? Is all that story mythical? Is not this the centre of all activities and of all wealth? Has not your reputation gone before you, largely made by such men as Dick Whittington, who began very slowly? Did he walk up to London, or did he come by motor? I believe he walked all the way. However we may fail to criticize the paper in a somewhat hypercritical spirit, I think, on the whole, it breathes the right spirit if the Commercial Gas Association can only carry out what Mrs. Brereton therein recommends—though I do not know what Mr. Brereton might say to some of the matters contained in the paper, some of which I read with fear and trembling. I have read about Plato's Utopia, and I have read about cities rising up from the ocean where everything was perfect; and I have come to the conclusion that we shall have Utopia in our midst if only the spirit of Mrs. Brereton's paper can be carried out. If the Association could only carry out the spirit of her paper, I am sure it would be a grand success in the future, as it has been in the past.

The PRESIDENT: I will now call upon Mrs. Cloudesley Brereton to reply to the discussion.

Mrs. CLOUDESLEY BRERETON: Mr. President and gentlemen,—I thank you very much for the kind way you have received the paper, and I hope you will do, broadly speaking, what nearly every speaker who has spoken on the paper has suggested—that is to say, take it rather in the spirit than in the letter. What I have tried to show is only just one broad principle—namely, that the domestic problem does not begin and end with the individual home, but is at the bottom, as home life is at the bottom, of all life; and that you, who have in your keeping, as doctors and other professional men, such enormous responsibilities and such enormous power for good or evil over the lives of the people whom you serve, should look to the broader aspects of the work you have undertaken, that you should look at it rather in the way that I always felt I did when I was the head of a college. I always thanked Heaven, when I was a Government Official, that I was doing exactly the work for my livelihood that I would have liked to have done for women and for children in the training of the teachers of the race, if I had been a free woman, with no need to earn any money, and had done it all for love—and perhaps, as I am only human, a little for honour and glory. I think that is one of the hopeful things for an industry like yours; and I could not have employed myself in it as I have unless there was a chance of doing some good with one's life over and above what one is earning. It is this spirit that I wish you to carry away with you now. That is the first half of the paper. But, being a practical and a business woman, I did try in the end of the paper to bring it down to earth, and make some imperfect recommendations as to the lines on which I thought—at any rate, in the initial stages, because I should leave you to work out your own salvation—my ideals and my ideas might be carried out. They come down to two common and everyday practical things. Just as I said to you in Manchester, I felt that in the two years I had been working in the gas industry I had got more of my medical ideas home, because I was dealing with sinks and fires, than in all the years before, when I was engaged in preaching to the converted. I want you all to feel that your work is a work that you can be proud of. It is not a thing on which you might say: "That is my business; and I live when I am outside it." Yours is a profession in which you can live when you are inside it. If you only take this ideal, as I am sure most of you do, I ask you to let it filter through to the men who have not your opportunities, so that those who are conducting the commercial side shall be just as proud of their work as the most important engineer among you. We used to look upon it, when we were characterized as a "nation of shopkeepers," as a term of reproach. I do not know really whether it was intended as such; but I think, as a matter of fact, it was not by the man who uttered it. It is a very old phrase—much older than many of us think. To be a nation of shopkeepers nowadays, when commerce is coming to its own, is a thing to be proud of, and not ashamed of. Provided that you have something to sell which is going to do good, you need not be afraid of your dividends. I should be, if I could do without any money at all, ashamed to undersell the women who have to make a struggle for their existence; and if you did not choose to pay what I am worth, I should tell you to get somebody else to do the work. I put the proper price on myself, for the sake of the women who have to work for their bread and cheese. You ought to feel that it is an honourable thing to do something commercial, provided that you have a perfectly clean slate behind you.

It is not often that Alderman Phillips misrepresents me, because he is a good old friend of mine. I did not say that the gas salesman ought to know more of the business than the great man knew himself, or more of a particular department than the foreman of that department. What I did say was that he must know as much of the broad principles, which is a very different thing. He must know as much; it would be a bad thing for the business if he knew more. He must know as much of the broad principles of any business he is dealing with as the managing director. The managing director does not pretend to know everything. He must know as much of any particular department—such as heating, lighting, and feeding the employees—as the foreman of that department. This is a position that I will not move from. In addition, he must know more how gas will apply to the broad principles and to the details of each department than any of the men in those departments. He has to do so if he is going to be worth his position in the company or corporation.

Then Mr. Edwards, who has always been a very helpful man to the editorial side of the Association, and whom I cannot thank too highly for all he has done in assisting the "Bulletin," and in other ways, remarked that what I said might be bad for the shareholders. I protest against this, because, of all things, I am astute on the point of economy. I do not say if you spend 2½d. on a salesman you are going to get 2½d. or 3½d. back to-morrow; but I do say that, if you take this broad view, you will in five, ten, or twenty years overtake your expenditure, because you will get back in pounds, shillings, and pence a return for your outlay. I protest against it being said that such an idealistic appreciation of the question will be bad for the shareholders. The very fact that we have had men like Lord Rayleigh, Sir Albert Paget, and others who are known all over the world, at the Gas Exhibition, asking questions, and then going home, and saying: "I am going to revolutionize my village or my town," or "I am going to alter the heating arrangements in my hospital," proves that, if you appeal to these people on their own ground, and show them that if they are sanitary people they can do their sanitary work better; if they are dentists they can carry on their profession better; or if they are town-planning people they can carry on their work better (we had John Burns there, and he was absolutely delighted); if you can show the administrator, the parliamentary man, the man who is doing town-planning, that he can do it better, as well as economically, you are not going to send your shares down but up. And if you do not do it, somebody else is going to, because, after all, public health will not be stopped by you.

As to Alderman Armitage, even a woman cannot reply to him. He is too brilliant with his idea of Utopia. That is what we all long for, and unless we do long for something that is much beyond our grasp, we cannot get anything. To come down to earth, and to conclude my remarks, may I add one practical thing, and that is I think you might take the "Bulletin" more than you do for your young salesmen. After all, it is very cheap; and I try to make it appeal to the young men. The more it gets into the hands of the fitters, the more I should make certain sections of it appeal to the fitters. Men for whom I have bought copies, men who have worked in my house, have been absolutely delighted

with it; and they have given me some of the most useful hints for leading articles, supplements, and editorial notes, because these men know the household problem. They know what people say to them; and though they cannot write an article, they can tell you what you ought to write, and they could tell the gas manager sometimes what he ought to do. I beg of you all quite seriously to take the "Bulletin" and let your young men read it. Your gas literature is quite beyond the fitter. He has neither the time nor the energy to look into it; but the gas-fitter can read the "Bulletin" every Sunday morning. He has not the editorial art of taking the gist of a paper, and leaving the rest. What he wants is something attractive, something in the nature of those rather amusing articles we have had in the last few numbers of the "Bulletin." They are as funny as "Punch." I did not do them; so I may say that. One of the most cantankerous fitters I have ever come across—a man I have had a lot of trouble with—said to me: "There is something clever in the 'Bulletin' this week;" and then he went off into a lot of paraphernalia which gave me the most valuable information as to what a woman thought could be done with hot water. I think, while you have an article that costs you so little, you ought to take it and let every one of your salesmen have it and read it. Thank you very much for the attention with which you have listened to me. I am only thankful if I have been of any use.

Mr. EDWARDS: May I say one word in reply to Mrs. Brereton? I did not mean to say that her ideals would injure the interests of the shareholders. What I did wish to convey was that one must cut one's coat according to one's cloth from time to time. You must not rush into all these ideals right away, and absorb all the surplus that legitimately belongs to the shareholders. This was my point. Some day I hope we shall all achieve those objects which Mrs. Brereton has laid before us.

THE WORK OF THE NATIONAL COMMERCIAL GAS ASSOCIATION OF THE UNITED STATES.

By OSCAR FOGG, of New York.

The PRESIDENT (Mr. Edward Allen) having introduced Mr. Fogg to the meeting,

Mr. F. W. GOODENOUGH (London) said: I hope Mr. Fogg will be fully restored to the good health he was enjoying when I last had the pleasure of seeing him. May I, on behalf of the Executive Committee, say a word of welcome to Mr. Fogg, as the official representative of the National Gas Association of America, which is the sister organization to ours on the other side of the Atlantic. I am sure the welcome will find an echo in the minds of all of you.

[As Mr. Fogg was suffering from a bad cold, Mr. Goodenough read the paper for him.]

In presenting this brief outline of the work and activities of the National Commercial Gas Association of the United States, I fear that the instructions of your Secretary have not been strictly complied with; for this is in no sense a paper, but merely a collection of notes, rather hurriedly assembled.

The suggestion has been made by several gentlemen prominent in your organization that a general description of the methods employed in America in the development and promotion of the gas business would be of interest to you; for it would afford a comparison of the relative progress of the two Associations in a work which has the same ultimate goal. To follow this line would be to unnecessarily encroach upon your limited time; and I would like to make it clear to you at once that, in my mind, no comparison is possible. You have, in the short period of your existence, completely distanced us in the one field of activity that should be, and with you has been, of first importance—that of publicity or advertising. We—after eight years of life—are only now on the eve of launching a national advertising campaign, similar in a general way to your own. We have considered it, planned it, and nearly executed it several times. You have done it; and you have done it well. Obviously, in this respect there can be no comparison of the relative progress of the two organizations. Perhaps you may consider that our efforts in other channels may to some extent tend to balance the scales. Certainly I hope so; for we feel and believe that the National Commercial Gas Association has been an instrument of no small force in the development and improvement of the commercial gas business in the United States.

The need of concerted and systematic effort in the stimulation and promotion of the commercial side of the gas business led to the formation of the National Commercial Gas Association in 1905. The originator of the plan was Mr. Lucius S. Bigelow, owner and publisher of a monthly periodical devoted to the interests of the gas business; and associated with him in effecting the organization were twelve other gentlemen, all prominently identified with the commercial branch of the industry. The pioneers in this movement realized the beneficial influence which an association devoted to the general betterment of the commercial side of the industry could exert. The policy of appealing to the public by rendering up-to-date and perfect service and placing on sale only efficient and well tested appliances had not then been generally given the attention and serious consideration that it now receives. The manufacturers of gas consuming appliances were working independently of one another, and lack of co-operation left much to be desired. Primarily, then, the effort was to bring about a more cordial relation between the public, the gas undertakings, and the manufacturers of appliances, as well as to provide an opportunity for the manufacturers to display their goods before the commercial gas men from all parts of the country, and at the same time afford gas men an opportunity for a full exchange of the ideas and plans in use in various localities—in short, an effort to place the commercial gas industry on a sound, modern basis, conforming to present-day merchandizing methods of the very highest grade.

This policy has prevailed, and has been enlarged upon. Educational work is now an important factor. Advertising, while not entirely neglected heretofore, is now to be taken up much more actively. In every way the organization is in a prosperous, healthy condition, with every factor working concertedly to maintain what we believe has long since been established—the supremacy of gas. That you may not be too much burdened with statistics, let me say briefly that our annual conventions, held each year in a different city, include an exhibition of gas appliances. For the last four years the number of members attending each convention has averaged 785, and the number of manufacturers exhibiting appliances 82. The present activity of the Association is, of course, of more interest to you than its past. The investigations and reports of the various committees covering a wide field, the numerous papers and lectures presented, the monthly bulletin and other publications, are of great value to us, and embody a wealth of useful information. These constitute but one phase of every association's work, and need not be further dwelt upon; for in these things our work is essentially along parallel lines. It is, therefore, only to those features of our Association's activity that may be considered to depart somewhat from the customary routine that I shall venture to refer.

The manufacturers of gas appliances have been encouraged by the Association to adopt a standard loose-leaf catalogue form; the loose leaf sheets being of uniform size, and perforated to fit a leather binder which the gas companies provide. This may seem almost trivial; but I mention it because the result has been that, at very little expense, every salesman may have a complete illustrated handbook of the appliances his company has to offer, and one which, by the substitution of new sheets, can be kept constantly up to date. New data and price or memo sheets of the same size may be inserted where desired, and in this way the salesman has in compact form, and available for quick reference, material which otherwise would be difficult to collect and carry. During the past year there have been prepared and widely circulated two booklets—one entitled "A Thousand Uses for Gas," which is a compilation of a thousand uses of gas for manufacturing purposes, and the other, entitled "Gas Illumination of Factories and Mills," contains data for large area lighting. Another booklet dealing with window and showroom displays is now being prepared.

There is also in preparation a fourth booklet, which will be more pretentious than those already referred to. Known as "Gas in the Home," or by some equally appropriate title, it is designed to serve as a standard reference book for architects, builders, plumbers, &c., as well as for the house-

owner. It deals at length with the installation and operation of appliances, the piping of buildings—with table of proper sizes, matters of ventilation, and much more information of this general character. Also in preparation is a "Standard Salesman's Handbook," which is intended to clearly and concisely set forth a description of the various forms of gas appliances, accompanied by illustrations, diagrams, and such technical information as may be desirable, and designed to give the salesman a more intimate knowledge of the construction and operation of the article which he sells.

In the effort to provide means for improving the window and floor displays in gas company show-rooms, the Association have collected a series of photographs illustrating the best examples of such displays throughout the country. These photographs are kept at our headquarters, and are loaned to gas companies upon request. This is much the same work that you accomplish by reproducing such views in your bulletin. Lantern slides and moving picture films are also coming in for their share of attention; and one of our Committees is now hard at work in this connection. Slides are already used by many companies; and it is intended to have available at our headquarters a large assortment, which the companies may draw upon as desired. The same practice will be followed with motion picture films, although the extent to which this is taken up will depend upon the success of those first used. Advertising I have already spoken of. That done by the Association has been so far limited to the distribution of the several booklets referred to, and to the collection of the best examples of newspaper advertising copy, reproductions of which are made on large sheets and distributed to our various member companies. The Association have not yet begun direct advertising in the sense that you have; but word reaches me that we had £11,000 pledged for this purpose two months ago. We have said that we would not start until we had £20,000 in hand, and that we proposed to continue indefinitely at the rate of £30,000 per year. It is my hope that this work will be actively under way before the end of the present year.

One important work undertaken during last year was the preparation of some standard specifications for the construction of gas appliances. The first section, dealing with domestic cooking appliances, has been completed and adopted. This specification was formulated by a Committee composed equally of appliance manufacturers and gas company representatives. The conflicting requirements of hitherto existing specifications have been reconciled, and an important step taken in the direction of standardizing gas appliances. This work will be continued from year to year. It is perhaps unnecessary to remark that too much standardization is worse than none; and we have been careful to stipulate nothing that would tend to hinder progress, destroy individuality, or in any way limit the manufacturer in his effort to better and improve his product. The intent is rather to encourage and assist in such improvement.

I have touched rather hurriedly on a few of the features of the work of our Association. In Appendix A is given a list of some of the Committees who are active during the current year; and the titles will probably convey some idea of other work in hand, which I cannot take the time to refer to in detail. There is, however, one subject to which we have given particular attention, and one which we believe is of the most vital importance in the development of our business—that of education. Progress in all branches of our present-day business life is rapid, methods constantly improve, the general tone of business intercourse advances, and we all realize now that the sale of service of the highest order is quite as important a part of our business as the sale of gas. We believe that if we are to keep our commercial gas business in the front rank, we must devote more attention to the educational betterment of our employees, particularly those who are much in contact with the public, as are the men connected with the selling organization. It is essential that they should have, in addition to the personal attributes that such work calls for, intimate knowledge of that which they sell, and of the business which they represent. In our opinion, the day of the "canvasser" has gone by, and the demand is for salesmanship of the highest order.

It is in the systematic education of men of this class that we believe we are accomplishing a good work. Our method consists of several graded correspondence courses of instruction, each course containing from ten to twelve monthly lessons, each lesson being supplemented by a series of questions. These questions must be answered in writing by the student. His work is carefully examined and given a rating; and, if he completes the course satisfactorily, he receives a certificate to this effect. This work is carried on under the direction of a competent instructor; the Professor of the School of Commerce and industry in one of the New York Universities. Associated with him is what we call the Board of Educational Control—a body of gas men representing various sections of the country, whose duty it is to act in an advisory capacity, to supply all technical data required, to determine the lessons before they are sent out to the student, and, in short, to act as a governing body in this educational work. Where a sufficient number of students is to be found in the same locality, the correspondence course is usually supplemented by class meetings, in which the lessons are explained and discussed under the leadership of a local member.

We have gone far enough in this work to know that it yields much in practical value. In the first course, 725 students were enrolled, and 216 more enrolled when the first course was repeated. In the second or advanced course, 694 students were enrolled. These first two courses dealt chiefly with the principles of gas salesmanship, but also included such general instruction in company organization, departmental functions and their relation to the selling effort, &c., as it was believed should be understood by every employee. We are now undertaking the third course, which deals with the utilization of gas and gas appliances, and of which a subject outline is given in Appendix B. It is expected that not less than 1200 students will be enrolled in this course; for it provides information which the average employee realizes he is lacking in, and which he has not been able to acquire heretofore—except in those cases where the larger companies have undertaken such educational work, or where the ambitious employee, anxious to extend his knowledge, has attempted to instruct himself through the study of text-books, the Technical Press, &c. The great advantage of a systematic educational course, specifically designed to meet the requirements of such men, is, of course, apparent.

If in these hurriedly prepared notes there has been anything that your Association as a body or any individual member may find of interest, please keep it in mind that it will be a pleasure for us to reply to any inquiry which you may care to make, and to provide full information on any of these matters which I have been able to but inadequately describe.

APPENDIX A.

COMMITTEES FOR 1913.

Accounting.
Amendment to Constitution.
Company Membership.
Development of Industrial Fuel.
Domestic Fuel Appliances.
Board of Educational Control.
Exhibitions.
Finance.
Home Equipment.
Indoor Lighting.
Membership and Local Sections.
Manufacturers' Committee.
Outdoor Lighting.
Papers.
Public Policy.
Publicity.
Relations with Customers.
Salesmen's Handbook.
Standardization of Gas Appliance Specifications.

APPENDIX B.

BOARD OF EDUCATIONAL CONTROL.

Outline of Course III.

LIGHT.

(A) Production (Principles of): (1) By heat: (*a*) Flame: 1.—Candle. 2.—Acetylene. 3.—Gas: (*a*) Open tip, (*b*) Argand, (*c*) Regeneration. (2) Incandescence of solids: (*a*) Welsbach mantle and earlier types. (*b*) Electric filament: Carbon, metallized, tungsten. (*c*) Electric arc: Carbon, flame. (*d*) Nernst. (3) Luminescence (Chemical action and electrical discharge): Phosphorescence, Moore tube.

(B) Distribution: (1) Laws of transmission of light. (*a*) Reflection. (*b*) Refraction. (*c*) Transmission. (*d*) Diffusion. (2) Reflectors, globes, and shades: (*a*) Translucent (glass). (*b*) Opaque (metal, &c.). (3) Reflecting and diffusing surfaces not a part of lamp: (*a*) Ceiling, side walls, &c.

(C) Utilization: (1) Vision: (*a*) Mechanism of the eye. (*b*) Effect of light upon retina. (2) Requirements for good illumination: (*a*) Illumination. (*b*) Distribution. (3) Measurement of light and illumination. (4) Planning, installation, and calculating operating costs.

HOUSE HEATING APPLIANCES.

Evolution. Blue flame *v.* yellow flame heaters. Types of heating stoves: Portable heaters for hot air: Tube radiators, cylinder heaters,

reflector heaters, cone heaters. Fire place heaters for hot air: Gas logs; gas grates, asbestos backs, fire brick or clay "incandescent fuel"; reflectors. Radiation heaters: Hot-water generators, steam generators. Heating from a central plant: Hot-air system, hot-water system, individual gas radiators. Connections. Adaptations to conditions. Selling points.

AUTOMATIC WATER HEATERS, STORAGE AND BATH HEATERS.

A short historical review. Analysis of automatic water heater construction, basic principles. Instantaneous automatic water-heaters. Automatic multi-coil storage systems. Instantaneous or bathroom heaters. Model installations, showing the ideal plan of applying the various types under different plumbing systems. Cost of heating water. Water heater troubles. Care and maintenance of water heaters. Salient selling points of the various types. Selling the customer the right type of his particular condition.

DOMESTIC RANGES AND NON-CONNECTIBLE ACCESSORIES.

Historical review. Construction of burners and operation of ovens. Types of domestic cooking appliances: Hot plate, cooker, single oven range, double oven range, cabinet range: Standard cabinet, short cabinet, extra short cabinet, special cabinet. Elevated oven range. Combination range. Additional equipment for gas ranges. Non-connectible gas range accessories. Other domestic gas appliances. All gas kitchen. Care of the range. Method of connection. Selling points.

CIRCULATING WATER HEATER.

Historical review. Combustion. Efficiency. Types past and present. Gas cock – fixed orifice *v.* needle valve. Flues. Connections. Comparative costs. Advantages of circulating water heaters. Selling talk.

HOTEL AND RESTAURANT APPLIANCES.

Introduction. Desirability of the business. Present and future of the business. Kitchen engineering. How to look for business. How to write to the manufacturer for advice. Comparative costs. Valuable hints. Elements of success.

GAS STREET LIGHTING.

A sketch history of outdoor lighting. The requirements of street lighting. Gas illuminants in general use. The less common gas illuminants. Automatic lighting and extinguishing apparatus. Advantages and disadvantages of gas equipment. Improvements in equipment needed.

DEMONSTRATION ROOMS AND WINDOW DISPLAYS

Demonstration rooms for instruction of employees. Window display: Lighting appliances, domestic fuel appliances, industrial fuel appliances, seasonable subjects, appliance comparisons, novelties, special displays for local affairs.

Discussion.

Mr. GOODENOUGH: I should like to mention that the Newcastle-upon-Tyne Gas Company have completed sufficiently to be shown a film illustrating the manufacture and application of gas; and we hope to have this film in London, at a picture palace near the exhibition, during next week. Before I sit down I wish to point out that it is possible for any member of this Association to become a member of the National Commercial Gas Association of America. The members of the General Committee are, I think without exception, members of the Association; and many members of the American Association are members of the British Association. I am sure you will all feel, after having heard the paper I have had the honour to read, that it will be of advantage to be in close touch with such a live body as the National Commercial Gas Association of America.

The PRESIDENT: I will now call on Mr. J. Ferguson Bell to propose a vote of thanks to Mr. Fogg for his paper.

Mr. J. FERGUSON BELL (Derby): Mr. President, ladies, and gentlemen,—I am sure you will all join with me in giving our friend from America, Mr. Fogg, a most hearty welcome to our congress to-day. We are glad that Mr. Fogg has been able to come here and be among us, because the Association which he represents was started some six years ago, and our Association has been much inspired by the work that has been done in America. I am particularly struck with the work that has been done there, and the progress that has been made. In the paper that we have just listened to, Mr. Fogg has indicated certain activities that we as an Association can follow—more especially with regard to literature and travelling exhibitions, so that the Provinces and the smaller towns which cannot afford to import lecturers or hold exhibitions can apply to the parent Association and get the assistance they need. Mr. Fogg has also referred to another thing which I hope the manufacturers will bear in mind, and that is with reference to a loose-leaf catalogue, from which we can detach pages from time to time. I often think our manufacturers put themselves to unnecessary expense in issuing catalogues which contain the same information from year to year, or even from month to month. If these catalogues were issued in loose sheets and pamphlet form, and if they provided us with a cover to put them in, it would be of great convenience to us as engineers. The suggestion that a handbook should be provided by the Association is one which I hope our Executive Committee will bear in mind. I remember a few months ago I bought a book called "Electricity for Everything;" and I thought what an admirable thing it would be if we had a book called "Gas for Everything." The book I allude to on electricity contained a vast amount of information with reference to the electric light, the candle power of lamps, heating a building, and so on; and I thought it would be an advantage to us if we had a book on gas which we could place in the hands of our canvassers and salesmen, so that they would be able to give approximate estimates at once when required. The question of standardization of gas appliance specifications is one that needs to be handled very tenderly. We do not want to go in too much for standardization; but our makers have made a certain advance with reference to gas-fires which I think is a very admirable one. The prominent note of this Association, and of the National Commercial Gas Association of America, is that we want up-to-date expert salesmen. When the manufacturer sends his representative to you, unless he knows exactly what he is talking about, he is doing more harm than good; and in the same way, unless we gas managers send expert men who know what they are talking about, we shall be doing more harm than good. We want to send men who know their business thoroughly well. The question has been asked why one tradesman should be a failure while his neighbour is a success. The reason is that one man uses his brains, while the other does not. One makes a good article, and takes pains to let potential customers know the article; and in the same way, we as gas manufacturers want to bring before the public the best article we can supply. I have the greatest possible pleasure in proposing that the best thanks of the meeting be given to Mr. Fogg for his illuminating and valuable paper.

Mr. GEORGE CLARRY (Cardiff): It affords me very great pleasure indeed to second the vote of thanks to our visitor from over the water. This is not the first time that we have had a visitor from abroad; but I think it is the first occasion upon which any gentleman visiting us has come forward to read a paper at our meetings. I can assure Mr. Fogg, on behalf of the Association, that we welcome his efforts in the publicity department which he represents. It seems to me that we owe a great debt of gratitude to the National Commercial Gas Association of America, because they have been in existence some years, and we know the high state of efficiency at which they have arrived, and we can practically start there. I think that I might almost go further, and say that we have gone one step better—not in the "One Thousand and One Uses for Gas," but in our publicity work during the past year. As you all know, you cannot pick up a daily paper at the present time without seeing something that is in favour of our industry. I do not mean so much in advertising matter, but in editorials; and this is largely due to the very excellent and the well-thought-out advertisements which our Association has brought before the public during the past year. I think we may look with some degree of pride on the fact that we have gone one better in this respect than our American cousins. I am sure you will agree with me that there is one prominent note running through Mr. Fogg's paper, or rather through the work of the National Commercial Gas Association. Mr. Bell has mentioned that he thought the dominant point was good salesmen. I am going to suggest to you that probably the dominant note of the National Gas Association is that of thoroughness. I do not think any of us can read this paper, or see the list of committees, without being aware that they must have a very splendid organization. It affords us, I am sure, ground for thought. We know very well that whatever our American brethren take in hand they do thoroughly; and in this respect I feel sure that they set us a very good example. If you look at the appendix to the paper, you will see there are no less than nineteen committees. I am sure these committees do not sit just to say "Ditto" to what some leading committee has ordered to be done. Evidently, each is working in a

groove in a defined direction, and covering a field entirely its own, to the general advancement of the cause and of the industry. I feel sure, therefore, gentlemen, that you will accord to Mr. Fogg a cordial vote of thanks for his paper, and a hearty welcome to our conference. He has indicated to you that we only now stand on the threshold of great possibilities in the future. He has to some extent indicated in what way these possibilities may be extended; and I am sure that we, with our native energy, and, as I may say, I think, modesty, in bringing forward these little things, will always endeavour to show our American cousins that we also have points to bring out. I therefore wish to emphasize the point that, with regard to this particular work, it is of the greatest benefit to our Association that we should receive visits from gentlemen across the water. I use this expression because we have visitors from other parts to-day; and it is to be hoped that we shall also have papers from them at future meetings. Let me, in conclusion, say that I am sure there are many members of the Association who would gladly go over to America and help to bring about that interchange of thought and good fellowship which will be so desirable and helpful to the gas industry. I have great pleasure in seconding the vote of thanks.

The PRESIDENT: Ladies and gentlemen,—I would like to add a word or two before putting this resolution. I have had the pleasure of meeting Mr. Fogg prior to the conference, and have found him to be a man of great ability. He has been chosen for a very important work by the authority of his undertaking—the Consolidated Gas Company of New York. He has come here to take notes, and one is proud to see that he is a man who is able to take notes. To day we are benefiting by his paper, which has given us so much information as to the work carried on in his own country. As has been said already, they had some years of life before we began to live, and we are benefiting by their experience. I appreciate the courtesy that prompts him to say he thinks we have gone ahead of him in this particular department; but we also desire to express our high appreciation of the work being done in America. On both sides of the Atlantic we are working to one end—namely, to benefit the people of the two great English-speaking countries by providing a good service of gas, which we think will solve so many problems. I want also to express my sympathy with Mr. Fogg in his recent illness, and our gratitude to him for coming here at some inconvenience and taking part in the conference. I would venture to ask all those who intend to join in the discussion to speak before I call upon Mr. Fogg to reply to the vote of thanks. We do not want to make the burden on him any heavier than is necessary; and, instead of asking him to speak twice—first acknowledging the vote of thanks, and then in reply to the discussion—I will ask him to address you once for all.

The resolution was then put and carried with acclamation.

The PRESIDENT: I will call upon Mr. Glover to open the discussion.

Mr. THOMAS GLOVER (Norwich): Mr. President,—I only heard a few minutes ago that I was expected to open the discussion on this paper. I really think that the mover and seconder of the vote of thanks have performed the office of opening the discussion. They have really traversed the important points in the paper. They have not criticized them very much, because I think that we all heartily agree with the points that the writer of the paper has made. There is one thing that I am sure we all appreciate in the paper, and that is that it might have been written by a Britisher. It is so British in its methods; and it lacks the exaggerated style that we sometimes associate with things in America. It may be we are getting Americanized a little; and perhaps there was room for the best that America could teach us. This old country occasionally gets into ruts, and we sometimes want a good shaking up; but when we are shaken up, we do go at a pace. This Association is an illustration of that. Many of our gas companies had got into a rut. In London, the hub of the universe, there were some that had got into ruts; but they have been shaken up, and are now going apace, helping us in the Provinces, who have not got the same opportunities, to learn something of what we ought to do in improving our salesmanship. I cannot find very much in the paper to talk about on short notice. We are all interested in the points that have been raised, especially the question of the education of the out-door staff. We believe in salesmanship of the very highest order, and that the day of the old canvasser is over. In this we are quite in agreement with the writer of the paper. The only question is as to the methods to be employed to bring about these desirable results; and no one can lay down a law which will apply to every circumstance as to how it shall be done. We must adapt our methods to suit our own conditions in every town.

But apart from salesmanship, canvassing, and advertising, there is the other point in which some of our Manchester friends have given us a lead, and that is the education of the gas-fitter. You know that gas can be a great nuisance. I mean, if the gas-fitter is a careless workman or badly trained; and if he leaves behind in a newly-decorated room the smallest escape of gas, which leads to the cutting about of plaster, wallpaper, and so forth, he brings a gas company into disgrace, and gives the manager and those responsible for the outdoor work a tremendous amount of trouble. This department, which I do not think is dealt with very much in the paper, is to my mind, a most important one. We should use every possible endeavour to teach our gas-fitters to be intelligent and reliable workmen, who will not leave behind them escapes, or bad work in any form whatever. Every job well carried out sells another piece of apparatus. Every successful gas-fire that is put in is the best form of advertisement, because it is seen by a great many visitors from time to time, who admire and appreciate it, if it is a good job, and if it is doing its work. There is another point that requires a great deal of thoughtful attention and education. We often require to put in our gas apparatus—gas-fires particularly—and attach them to chimneys where there is some persistent down-draught. I believe that in many circumstances there are cures for such awkward things; but they are not known to the ordinary gas-fitter. The disgrace, or whatever it may be called, that will follow the use of the gas-fire fixed under such circumstances, is not appreciated by the gas-fitter. But it comes home to the gas company; and so we have to study the question of ventilation air inlets as well as fume outlets, to get our gas apparatus working successfully. I am quite certain there is a great deal to be learnt and done in this direction. I have been preaching this for some time; and it seems to me that it is being taken on—not through my teaching, but through an appreciation of the whole thing, especially in the supply of hot water. I appreciate it very much, because the circumstances in my city seem to be favourable to the installing of hot-water apparatus. It may be that in an old city, where bath-rooms have only recently become the fashion, rooms which were never intended for it are converted into bath-rooms; and hot-water appliances such as we supply are the very best thing that can be used in such circumstances. The circulator and its kindred appliances are more or less for the comparatively wealthy—the better middle-class homes and the mansions of the well to do. But I am certain the handy geyser over the bath can be fixed in thousands, if we would only apply ourselves to making its merits known. I am glad to have had an opportunity of contributing, however little, to the discussion. I may not have stuck very closely to Mr. Fogg's paper; but I am quite in agreement with all the points he has made.

Mr. ROBERT WATSON (Doncaster): Mr. President, ladies, and gentlemen,—I do not know that I intended to speak, but for the hint given to me by Mr. Goodenough. As I have the opportunity now, there are one or two things that I may perhaps refer to. First of all, I should like to add my note of appreciation of Mr. Fogg's excellent contribution to our proceedings, which contains much useful information as to the work done by our colleagues in the States. We over here follow with the keenest interest the work that they are doing, as I am sure they do the work that we are engaged upon in this country. A good deal of reference has been made to-day to the question of gas salesmanship, both by Mrs. Brereton in her admirable paper and also by Mr. Fogg in his contribution. The multitude of things which we are called upon to do at the present time is great indeed; and it is very difficult for every one of us in our respective spheres to keep abreast of the times—not only as to the gas apparatus, but its application. I had crossing my mind this morning, when listening to the elaborate education that Mrs. Brereton suggested we should indulge in, some of the things that I have had to take into consideration in Doncaster the last two or three years. I remember that I have been called upon to give advice as to the

use of gas for brass-melting and for tempering wire, and recently the adoption of high-pressure gas for butter-scotch making. I also had a few months ago to consider the needs of the malting industry; and I had to read up a fairly long treatise on malting so as to decide what was necessary in connection with malting purposes. This was very useful to me, because I was able to talk to the maltsters who were using our fuel, and who were troubled at the time with arsenic. Then I also had to consider the question of the use of coke in the production of portland cement; and there, again, I got involved in some contributions and papers which it was necessary for me to study in order to know what I was driving at. I refer to this, not to lead you to think that I spend all my Sunday mornings inquiring into things outside my own profession, but to show the difficulty we have to keep up with the times.

I might mention something else, and it is that we have heard nothing whatever of what the salesmen of the Society of British Gas Industries should know and do; and I am quite sure the gentlemen representing the Society would excuse me if I were to refer to where I think improvements might be made in connection with the work their representatives are doing at the present time. I remember a short time ago a gentleman bringing before me the advantages of a particular gas-fire which had been put into his hands for disposal. When I asked him a question as to the gas consumption of the fire at different pressures, and as to the efficiency of the fire at these different pressures, he knew absolutely nothing. He said he would make a note of what I inquired about and look into it. Now, this ought not to be the state of affairs. I have known the same thing in connection with gentlemen supplying gas-burners and mantles. They know nothing whatever as to what their particular burners and mantles would do under certain conditions. I would suggest to the gentlemen representing the Society of British Gas Industries who may be present here to-day that they should take this matter into consideration with those who are pushing the use of gas. I have only mentioned gas fires, burners, and mantles as being illustrations of the point that I want to make—that it is a great advantage to us in our several towns, when representatives of different firms come to us advertising and suggesting certain appliances for specific purposes, that they should know what they are talking about. If I have occasion to speak of the use of high-pressure gas for industrial purposes, it is important that the gentlemen who are supplying this particular apparatus should have instructed themselves, so as to be able to give me the latest information on the subject. I say the "latest," because the firms in question must have made experiments. However, I merely make the suggestion. I have been led on to refer to the subject because, though Mr. Fogg does not immediately refer to it in his paper, except that he alludes to standardization, it is to some extent germane to the subject which he has brought before us to-day. Mr. Bell made some reference to loose-leaf catalogues. Here, again, I think that we should be materially helped if manufacturers generally would adopt some system of having standardized sheets (so that we can place them on their respective files), and keep subjects which are not akin on different sheets. It is very disadvantageous to have sheets that cannot be properly pigeon-holed in this way; and I think the suggestion that was made by the National Commercial Gas Association of America might be followed. Not only would it save the time and expense of getting out elaborate catalogues, as Mr. Bell has suggested, but it would possibly also lessen the number of things that at the present time go at once into the waste-paper basket.

Mr. Samuel Tagg (Preston): Mr. President, ladies, and gentlemen,—Mr. Fogg, in his paper, has briefly described the methods adopted by our friends in America in the development of the gas business; but his paper deals solely with the methods employed by the Association, and does not refer to the individual work of the various undertakings comprised within that area. It seems to me that the work of the National Commercial Gas Association supplements the work of the individual undertakings; and it must always remain the fact that the individual work is the most important that an undertaking can do. I think, in connection with this, it would be of interest to know what information was obtained in response to a circular that was sent out inquiring as to the expense incurred by local undertakings in advertising and further promoting the interests of the industry. Taking our own particular case, our expenditure in this direction has been some three times that of our annual contribution to the Association; and I feel that the expenditure which we incur, and which we can more directly apply, is probably more productive than the national expenditure. I am not for a moment saying that the national work is not required in addition to the local work; but I wish to call attention to the importance of the work done by individual undertakings, and which in this paper of Mr. Fogg's does not appear to have received attention.

The President: Now, gentlemen, I will ask Mr. Goodenough to say a few words. This subject, as you know, is one that lies very close to his heart; and we shall be very glad to hear some remarks from him.

Mr. Goodenough: Mr. President,—I do not want to take up the time of the meeting with any lengthy observations of my own; but there are just one or two remarks I do wish to make. One of them is in answer to Mr. Tagg, as to when information would be published regarding the replies to the inquiry sent out to the various undertakings as to the amounts they are expending upon local publicity, as well as national publicity work. We are waiting replies from one or two undertakings that have promised them; and we shall be in a position to publish some very interesting information at an early date. It is interesting to note the wide divergence among the various undertakings in the amount they are spending. It is not by any means always the smallest undertakings that are doing the least proportionately in the development of our business. The special point that I want to refer to in Mr. Fogg's paper is where he says that we must devote more attention to the educational betterment of our employees, and particularly those who are much in contact with the public, as are the men connected with the selling organization. The only observation I want to make there is this—that it is not only education in the sense of technical information as to the construction, fitting, and utilization of the various appliances with which they have to deal that we want to give our men, though this is very necessary, but it is also training in the business methods that are likely to bring about permanent business success. The spirit in which the public should be approached, the absence of all exaggeration in the making of claims for apparatus that is recommended to them, and the desire to serve the consumer to his advantage, is what will ultimately lead to the benefit of the undertaking in whose service the salesman is employed. What I want to point out is that it is no use our meeting here, and our having right ideas in our minds as to the spirit in which the consumer should be dealt with—a spirit which does not curse the complaining consumer, but sets to work at once to get to the root of his trouble, and convert the complaining consumer into a satisfied consumer—if we do not convey these ideas persistently and consistently to all our employees in all the different grades. It has been suggested this morning that a gas manager should much more frequently get into personal touch with all the members of his staff; and I attach very great importance to this. It is so essential that the spirit which animates the administration should go right the way down, and that managers should take opportunities of explaining things to their employees, who are necessarily less intelligent and less well educated than they are themselves, or they would be occupying higher positions, because you do not expect a £10 a week brain in a £2 a week man. It is necessary that the manager should explain his reason for adopting certain ways of dealing with the public. It is no use shutting yourself up in your office with the prevailing idea in your mind that you would like the public treated in an efficient manner, if you do not take steps to see that your men do their work in an efficient manner also. That is what I thought I should like to contribute to the discussion on this valuable paper.

Mr. W. E. Price (Hampton Court): Before Mr. Fogg replies, I would like to say a few words on the paper he has just read to us. Previous to doing so, I should wish to add my appreciation of his goodness in coming over here and giving us this paper, which we have all appreciated very highly. Turning to Appendix A, he there gives a list of committees. When he comes to reply, I think it would be of interest to the meeting if the author were to give us a little information as to these numerous committees, and just

in a few words say what their work is. The committees here enumerated strike me, as one who has been concerned very much in this work on this side of the water, as being interesting; but, at the same time, from my point of view, they seem to be somewhat ambiguous. I am sure it would be of advantage if Mr. Fogg were to say what some of the committees have to do. I have marked one or two of them. Take, first, Company Managership, I should like to know what he means by this. I do not want to put my interpretation on it. Then I wish he would tell us about the Development of Industrial Fuel, because this seems interesting. Then Domestic Fuel Appliances, Board of Educational Control. The names are very comprehensive, and sound to me as if they were attempting a great deal. Then we have Home Equipment, Indoor Lighting, Membership and Local Sections. That is what we are considering here, how we can work a local section; and it would be interesting and most helpful to us if Mr. Fogg were to tell us what they do. Then there is the Manufacturers' Committee. We have something of the same sort of thing here. Then, Relations with Customers. We have heard more of that, though not in the same way, this morning than anything else. I think if we take only a portion of what we have heard, and let it soak in, our relations with our customers will be more than ideal. Then there is Standardization of Gas Specifications, which seems to be interesting. I do not know how manufacturers look upon such suggestions on this side. I have not heard any remarks made on it since it has been applied. I should like Mr. Fogg to give us a little information on these points.

The PRESIDENT: I will now ask Mr. Fogg to be so good as to reply to the discussion.

Mr. OSCAR FOGG, who, on rising, was received with loud applause, said: Mr. President, ladies, and gentlemen of the British Commercial Gas Association,—I rather hoped that I was going to be allowed to get through without much in the way of reply. My b's and t's are in serious conflict, as the result of a rather severe cold in the head; and when a man cannot talk intelligently to himself, he hesitates to try to talk to other people. Yet I would not wish to avoid the privilege of expressing my most hearty thanks to you gentlemen who have spoken so kindly, and who have received me so courteously. The gentlemen who have been interested in some particular point that is contained in the notes, I would remind that I have only attempted, and at the request of your Secretary, a very short description of our general activity. To Mr. Tagg, particularly, I want to say that I very carefully avoided mentioning the things that he speaks of—namely, the activities of the gas companies, as distinct from the activity of the Commercial Gas Association. If I had let myself wander in this direction—well, I do not know where I would have stopped, because really I would not want to convey the impression that the gas companies are in the least backward in independent promotive work. The Company that I have the honour to be employed by, under the lead of Mr. George Cortelyou, one of the most progressive men we have in the States, I think has set a mark on the gas industry in America. In some directions we have shown the Association what to do; in many other directions the Association has shown us. But it is the happy combination of company activity and association activity, and the right spirit that brings both together in the happy combination which we believe will do more than any one of us could do alone.

The specific activity of the several committees is rather a lengthy subject to discuss; but I would be glad to do as much of it as I can. I would like to do something that is even better—that is to put before you a complete description of the activity of every one of these committees promptly on my return. I will only take up a very brief space of your time in trying to amplify what I quite appreciate is a somewhat ambiguous statement. Company membership deals with increasing the membership of our Association in that grade which we define as company members. We have two classes, as you know. We have individual members, who may be anybody who is interested in the development of the gas business in any capacity whatever. We have company members, who may be either a gas company or gas appliance manufacturers, accessory manufacturers, or some company, or firm, or organization interested in the general gas business. Now, it is this class of membership that we are particularly trying to increase, because we get more money from them, and they pay on a scale according to their output if they are gas suppliers, and according to their revenue if they are gas apparatus manufacturers. We have found it important enough to make a special appeal to increase this class of member. We want to get them—that is the point. Then, Development of Industrial Fuel. I think we are idealists in a way. At any rate, I like to feel that I am. I rather feel, if I am able to spend one-half of my time working and the other half dreaming, that I am serving my Committee. We are dreamers, if you like; but we feel that we have as yet not even scratched the surface. So we picked out half-a-dozen of our most imaginative men, and turned them loose in that field by themselves. This may seem a very silly thing to do; but we know that they are going to come back to us with something. They are going to put their imagination into something that practical men can work up and turn to the good of the industry. This explanation is not very explicit; but it is the best I can give. Next, I come to Domestic Fuel Appliances. This, no doubt, is rather odd. It comes to us in this way. After our meeting in Atlanta last year, one of our young men said he felt that our Association did not pay enough attention to the young men—that those of us who had in a way established ourselves and were recognized were asked to take up work and to become prominent in some way or other, but that he had some ideas on the subject of domestic gas appliances. We quite promptly appointed a Committee on Domestic Gas Appliances, and made him the Chairman of it, without dreaming or caring what it was going to bring forth. Yet right there we find this particular young man bringing us results in the development and improvement of domestic gas appliances. We had overlooked some things that this young gentleman has brought to our attention; so we are going to adopt them, in spite of the fact that we have standardized appliances.

The principal point I want to keep to in my reply is the objection of servants to existing types of domestic appliances. We have met, I believe, every other objection, and thought we had met these. But we find from the tabulated information in the work of this Association that we have not even dreamed of them. We do not know anything about it. We are very much ashamed of ourselves; and we are going to try to meet it. Then the next I come to is the Board of Educational Control. I have already referred to this. It is a governing body having to do with all educational work the Association undertakes. Next I come to Home Equipment. I have remarked on the work this Committee is doing. It has in preparation a book that I referred to as our most pretentious work—a book in which we want to incorporate real, true, straightforward information that architects, builders, and plumbers may take and read, and be interested in. That is purely the work of this Committee. It may seem to you a small task for a committee to undertake. It is a book that we have rejected from the Committee more than once; and they have been working on it for over two years. They seem to have a light job; but we are keeping them rather busy. Now I come to Membership and Local Sections. This Committee tries to increase individual members as distinguished from company members, and to organize in the various parts of the country Local Sections of the Association. We try, wherever it is possible, wherever there are enough gas men gathered together in any one district, to establish a Local Section or Association that will meet at least monthly if possible, and discuss the various activities and work that the Association has in hand. This is a scheme which is not perfect by any means as yet. We have so far Local Sections in only four of our largest cities; but it is a work that we are trying to extend. Relations with Customers. I guess we all know that there is something to be done in this direction. I guess it is the same with you as it is with us. An old monopoly grown into a modern thing cannot fail to have a great deal to do in this direction. We want to make our relations with our customers very much better, very much more cordial, than they are, and in every way to do everything that can be done to gain the confidence of our customers. It is the duty of this Committee to think out ways and means for this purpose. Salesmen's Handbook. I have referred to this somewhere in the body of my notes. Standardization of Gas Appliance Specifications I have also referred to. I have tried to emphasize a little warning there. It is a very delicate subject; and I do not want you to think I am advocating anything. I am trying to put before you what you have asked me for—a very brief

outline of the work we find it profitable to do; and I quite realize that the things which suit us, the things we need, may be entirely different from the things that your conditions demand.

I shall not attempt any more in the way of reply, if you will forgive me; but I want you to know that a very warm welcome awaits you in America. I have already been successful in persuading your honoured President here to be with us next year; but I want to say that if we can succeed in making him just half as much at home as you have made me feel, he will be quite content. On behalf of the National Commercial Gas Association, let me say that we welcome any members of the British Commercial Gas Association at any time, and will always be honoured to receive them. Further, that whenever an opportunity arises for the co-operation of our organization with yours, for the promotion of the industry that we all try to serve, if it can be done with advantage, you have only to let us know it. In conclusion, I thank you very much for your kind appreciation of my efforts. [Applause.]

The PRESIDENT: Mr. Fogg will realize from your applause that we have appreciated very highly the paper he has placed before us.

THE APPLICATION OF BUSINESS PRINCIPLES TO GAS SUPPLY.

By T. WADDOM, of Newcastle-on-Tyne.

In considering the subject of the application of business principles to gas supply, it is well to remember that, while statutory gas undertakings have in effect been granted by Parliament the privilege of exclusive supply of gas within their respective areas, such grants necessarily carry obligations other than those specified in the Gas Acts. These undoubtedly include the duty of providing the public with the best possible service in a business-like manner. An exclusive privilege is not conducive to the application of progressive commercial methods; and I am afraid this was particularly the case so long as gas had no serious rival. Undertakings were content with the expansion of output which their privileged position automatically secured to them. Gas was supplied where asked for and payment adequately secured; but no effort was made to advise as to how the gas should be consumed, nor were any steps taken to suggest other uses for it than those which the consumers might discover for themselves—they were, in short, left entirely to their own resources.

THE AWAKENING.

The awakening from this comfortable attitude was brought about by two events; the first being the invention of the electric incandescent lamp. I well remember one morning in the month of October, 1880, when, as we sat in the Rental Office in Newcastle grinding at our huge, and now obsolete, rental roll books, a resident of the town, Joseph Wilson Swan (now Sir Joseph), well known to us as a distinguished scientist in the field of photography, startled us by the announcement that he had solved the problem of low-power electric lighting, and that it would be possible to light up our houses, shops, and offices with electric light as easily as we then did with gas. He invited us all to attend the local Literary and Philosophical Institution on Oct. 21, 1880, when he purposed delivering a lecture explaining the wonderful discovery he had made, and which was destined to have such far-reaching effects. This was probably the first announcement of the invention made to a British gas undertaking.

The second cause came some five years later by the welcome and timely invention of the Welsbach incandescent mantle, which, while it provided a valuable medium for competition with its new rival illuminant, had also the alarming effect of reducing the sale of gas, owing to the very much less quantity required to provide a light equal to that yielded by the flat-flame burner. These two circumstances (particularly the latter from the directness of its effect) proved to be the stimulus required to arouse the dormant energy of the gas industry. Events gradually led individual undertakings to recognize the fact that methods on more progressive lines would have to be introduced into the conduct of that part of their business relating to gas supply, if stagnation, and possibly disaster, was not to ensue. Greater pressure of competition had arisen in most trades compelling the adoption of new methods, and why should the gas industry be exempt from similar influences?

The progress of those undertakings which had decided upon a forward policy developed slowly, owing in a great measure to the difficulty in getting out of grooves and ruts—the natural result of the former monopolist methods—and also to the absence of any organized effort on the part of the whole of the undertakings. But the progress has recently been greatly accelerated; and, now that co-operative organization is an accomplished fact, will proceed at a still greater increased rate, and each undertaking's share of success will depend entirely on the degree of the progressive spirit exercised in its management, and the application of business principles in regard to the development of its gas supply.

ESSENTIAL CONDITIONS TO SUCCESS.

Two essential conditions necessary for the success of a gas undertaking's business are: First, the rendering of an efficient and satisfying service to its consumers; and, second, the adoption of well-devised schemes of publicity. These being concurrently fulfilled will secure the continuance and recommendation of existing consumers, increase their number, and increase the use of gas generally.

It is well to keep in mind the importance of the retention of existing business, because many standing charges remain the same whether it is retained or lost, and loss of gas consumption generally means, in addition, loss of some of the capital expended for that business. It is also to be remembered that increase of consumption by present consumers, either through the medium of existing or additional apparatus, owing to it requiring less outlay, is more profitable business than consumption by new consumers, although the latter has a distinct value in reducing standing charges per 1000 cubic feet, and assists in cheapening production and distribution.

THE SERVICE NECESSARY.

We must, therefore, in order to conform to these essential conditions, do all in our power to give prompt, efficient, and economical service; cultivate the confidence of the public; break down old prejudices against gas and any lingering remnants of the old feeling on the part of public and private consumers that what is good for the gas undertaking of necessity cannot be to the advantage of the consumer; keep in close touch with consumers, in order to ascertain and anticipate their needs; and bring to the notice of every actual and prospective consumer as fully as possible authentic information in regard to the manifold advantageous uses of gas, and the particular services which the undertaking is prepared to render—not forgetting that the satisfied consumer is of the greatest assistance and the dissatisfied a hindrance to the success of the undertaking.

SALES OF GAS DEPARTMENT.

To carry out these objects a department—with a competent superintendent—entrusted with the duty of conserving and extending the consumption of gas will be required. It may be appropriately styled the "Sales of Gas Department." It must be very carefully organized if the fullest value is to be realized for expenditure upon service; for organization is a material part of business principles, and without it much energy and money will probably be wasted. The number of the staff will necessarily vary according to the size of the undertaking; but, large or small, the members thereof must be well educated, tactful, and trained for their special duties, and, above all, be imbued with enthusiasm for their work. They must study the problems of the use of gas in all the many phases that present themselves in the homes and businesses of the infinite variety of consumers supplied, and those who should be supplied. They should be competent to advise the consumer how he can best, and in his own interest, make use of gas in his particular home or business. It is of great importance that they do not make any statements that cannot be truly vouched for, nor, merely for the sake of selling or hiring-out an apparatus, withhold any statement that ought to be made. Their mission is to sell gas. Apparatus is the means of using gas, but it must operate to the satisfaction of the consumer; and the department will certainly fail completely in accomplishing its object if the consumer finds that the apparatus is not as efficient as he was led to believe it would be. Such a department should include experienced lady interviewers if possible.

The undertaking's area of supply should be divided into

suitable districts, each of which should be in charge of a representative with one or more assistants. The district representative should be responsible for the acquirement of a thorough knowledge of all that is taking place in his particular district, so far as it concerns the supply of gas to the inhabitants thereof, and for such measures being taken as circumstances may suggest.

The consumers' meter cards should be closely examined by the representative, and, where the consumptions are abnormal (whether above or below the average of previous quarters), investigations should follow, and the reasons be ascertained. This provides opportunities for advice or suggestions being given to, and for improving relationships with, the consumer—it may be that waste of gas is checked, or attention called to the advantage of using some apparatus suitable to the consumer's needs. The representatives should cultivate good relationships with doctors (of whom in Newcastle over 88 per cent. use gas-fires); architects and builders, with whom endeavours should be made to have special arrangements for the provision of gas apparatus in new premises; and also with education authorities with a view to obtaining facilities for cookery demonstrations and competitions for school girls—our future housewives.

Whenever any appliance is ordered to be returned, the representatives should call and endeavour to find out why, and, if possible, induce the consumer to retain the appliance or else have one more suitable. They should also interview all new occupiers of premises in the mutual interest of the consumer and the undertaking.

Publicity.

Publicity is, of course, inseparable from the responsibilities of a Sales Department; for in endeavouring to sell we must, by well considered, persistent, and adequate schemes of local publicity, let it be known to everyone who is, or ought to be, interested what can be done with gas, how it can be done, and what the undertaking is ready to do to assist the consumer. Inexhaustible are the forms of publicity. To name only a few: Foremost are the recommendation of satisfied consumers which a good service secures; then come show-rooms, exhibitions, lectures and demonstrations; and a liberal distribution of the excellent, yet cheap, literature obtainable from the British Commercial Gas Association, by enclosing it with receipts, estimates, and local correspondence, handing to consumers calling at the offices to pay accounts, and placing some in an inviting manner about the show-rooms and offices. These should be supplemented by catalogues showing the terms on which fires, cookers, and hot-water apparatus are supplied, and other pamphlets showing the facilities the undertakings offer to the public. A sample page of a recent issue of the latter description is given as Appendix A. The issue of "Business-Getting Letters" calling attention to the advantage of appliances suitable for the particular season, and enclosing some of the literature I have referred to, have been found very successful. These in a large number of cases elicit replies requesting further information, which, of course, is supplied by a representative calling upon the consumer. Special suitable displays of the appliances in the show-rooms are to be run concurrently.

It may be that the district is an industrial one and includes workshops and manufactories, in which case a wide field is open for bringing before consumers the advantages of gas for power and industrial fuel. Copies of the new publication issued by the British Commercial Gas Association, entitled "A Thousand and One Uses for Gas," should be sent by post to these consumers, addressed personally to chief officials, and followed up by periodical visits of representatives, when opportunities should be sought for giving information, making suggestions, and answering questions, the superintendent taking in hand important cases. This is a branch of an undertaking's development that has immense possibilities—as no doubt Mr. H. M. Thornton will show in his paper to be read later in the day.

Generally, the consumption of gas when used for industrial purposes runs into large quantities per hour, and means an increase of the day-load of the undertaking without corresponding increase of the night-load. Two recent industrial installations in Newcastle will probably result in an annual consumption of 200 million cubic feet. Consumptions such as this are worth a great deal of publicity to obtain; and I feel certain that if there had not been the recent progress in the gas industry, none of this business would have been secured.

Show-Rooms.

Show-rooms are an indispensable part of publicity. They should contain samples of all reliable—and none other—apparatus for the use of gas. There is too little room for the reliable to admit any that will not provide permanent and satisfied gas consumers. Gas show-rooms, in my opinion, ought to be known to the public as show rooms rather than sales rooms, so that the public may feel they can inspect the exhibits as often as they choose without being expected to place an order. This I am certain would be to the ultimate benefit of the undertaking. Provision ought to be made at show-rooms for showing how gas may be profitably used in the home, shop, office, factory, &c. This can be done by means of model dwelling-rooms, bathrooms, workshops, and other exhibits in which gas lighting and other apparatus are shown in operation. The exhibits ought to be changed frequently. Accommodation should also, where possible, be provided for lectures on, and demonstrations of, cookery and workshop processes. [A reprint, with illustrations, from this month's "Bulletin" regarding a show-room recently opened in Newcastle is attached as Appendix B.] The show-rooms should be at the service of the plumbing and gas-fitting tradesmen to introduce to their customers the latest examples of apparatus of all descriptions, and appliances should be supplied by the undertaking to those tradesmen at practically cost price.

Appliances: Supply, Fixing, and Maintenance.

It is necessary to supply appliances on terms which make the use of them possible to the largest number of the inhabitants—*i.e.*, by having reasonable hire, hire purchase, and cash systems, so as to suit all classes of consumers. It is also necessary to take measures to secure the proper fixing and maintaining of appliances if the greatest degree of satisfaction to all parties is to ensue. Some undertakings may find themselves compelled in their own interest to do the fixing of all appliances; but others, where the tradesmen of the district are willing to assist them energetically and intelligently, will find it advantageous to welcome their co-operation. This is fortunately the position in Newcastle, where a working arrangement is in course of settlement under which work will be handed over to the tradesmen in proportion to the business they may bring to the Company; and I have every confidence the arrangement will be of material advantage to both parties. Of course, the work will be carried out in all cases to the specification and satisfaction of the Company. I may add that this arrangement has now been definitely settled.

The undertaking should be sure that the consumer knows how to properly use newly installed apparatus, and that he is satisfied with it. In the case of cookers, this should be done by lady experts calling upon consumers, and similar service should be rendered to users of all other gas apparatus. It is too much to expect a consumer, without proper instruction, to get the best results from appliances of which he has probably had no previous experience. In the event of failure he will be inclined to blame the apparatus rather than himself and thus become a hindrance to development. In other lines of business, it is becoming general to ascertain whether the customer is satisfied with what has been supplied to him. We must not be content with satisfactory installation. We must go further and maintain in proper working order not only incandescent burners, but cookers, fires, hot water appliances, high-pressure lamps, and industrial and all other apparatus if the consumer is to continue to be satisfied. Take fires as an instance, we all know that they require to be overhauled periodically; but in how few cases do they receive any attention if the work is left to the consumer to see to? We know, too, that when the fire fails to give out the heat it did when first installed, there is a likelihood of its use being discontinued; and, even if it is continued, the gas consumed is to a great extent wasted, which is neither good for the consumer nor the undertaking. Therefore, this service is of considerable importance. This, again, is not a necessity peculiar to gas undertakings, for maintenance schemes are rapidly increasing with progressive firms in many other lines of business. When the work is systematically arranged, and the staff thoroughly understand it, the expenditure on this service is very favourably affected.

Complaints.

Even the best regulated and most carefully organized undertakings will receive complaints from their consumers.

They may be with reference to the consumption of gas, or to the supply being deficient, or, perchance, some delay in fixing an apparatus. Many of these complaints are quite inevitable, but it is necessary that they be attended to promptly; otherwise there will be in addition complaints as to inattention. Therefore, there should be an organized complaints staff, experienced in getting to the root of things and rectifying matters promptly.

Training of Staffs.

It is obvious that the work entailed in the giving to the public a service such as I have outlined cannot be performed efficiently without staffs properly trained for their respective duties. It is, therefore, imperative, in order to get the best value for the money spent on service, to provide such special training as is suitable for each department. The methods of doing this will depend upon circumstances.

The staff of the "Sales of Gas Department" will require to obtain as much knowledge as to appliances as possible through the medium of instructions in the show-rooms, lectures, demonstrations, a well-stocked library of books, periodicals and other literature provided by the undertaking, bearing on the subjects serviceable to them in their training, to which should be added lessons on salesmanship, and frequent conferences, when problems relating to the various phases of their work should be discussed. A training such as this, together with the experience gathered in the course of the daily round, will make for competency of the staff for their exceedingly important work.

Provincial undertakings can only envy the thoroughness possible to the Gaslight and Coke Company in respect to the training of a fittings staff (as described in the valuable paper read by Mr. F. W. Goodenough at the last meeting of the Institution of Gas Engineers); but I trust that something upon similar but co-operative lines may be possible through the District Associations. The latter might also include in their schemes the special training of ladies required for the sales of gas department in their districts.

With respect to the training of fitters and other members of the staffs, I may mention that the Special Purposes Section of the North of England Gas Managers' Association, during the winter months of recent years, have carried out series of lectures on co-operative principles, with demonstrations by experts (who have willingly given their services for the purpose), with a view to the principles and methods of fixing and maintaining gas appliances being thoroughly understood by those to whom such knowledge is necessary. Each lecture was delivered at four centres in the North of England, conveniently situated for the staffs of the various undertakings. They were exceedingly useful and appreciated not only by these staffs, but also by the tradesmen plumbers and their workmen who were invited to attend. The expenses, which were not heavy, were borne by the undertakings in proportion to output.

The training of the staff of the rental department, many of whom come into close touch with the consumer, and have power for good or ill according to their efficiency, must not be neglected. They must be educated and trained to the handling of the public on commercial lines and encouraged to suggest opportunities for new business. The members should, therefore, be invited to attend lectures and demonstrations, which are useful in this direction and also a preparation for qualification to fill vacancies in the sales of gas department.

Fitting Shops.

The fitting shops and stores will require to be so organized that estimates are expeditiously and accurately prepared, prompt attention and efficient work shown in fitting and maintaining apparatus, economy exercised, and proper costs kept, for which a good costings system will be found a valuable aid. Particulars of such systems will be found by reference to the "Journal of Gas Lighting" for Oct. 4, 1910, and "Gas World" for Jan. 8, 1910. Provision should be made in this department for the examination and testing of all new apparatus before submitting the same to the public.

Creating a Sales of Gas Staff.

The task of creating a staff for the sales of gas department may very profitably be assisted by cutting down all unnecessary work, and the introduction of labour-saving methods—really applying business principles—in the rental and other departments, and the transference of the most suitable members to the sales department. These if carefully selected will, with a competent chief, training, and experience, prove efficient representatives of the undertaking in its dealings with the public.

The Newcastle sales of gas staff consists of—

1 Superintendent.
1 Assistant superintendent.

Outside.

4 District representatives (about 30,000 consumers per district).
7 Assistant district representatives.
1 Chief lady interviewer.
1 Assistant lady interviewer.

Chief Show-Room.

10 Salesmen and clerks.

Saville House Show-Room.

4 Salesmen.

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Being an entirely new department, the equipment thereof would, in an ordinary way, have necessitated the employment of 29 more individuals; but, by the adoption of card systems for meter reading and prepayment and ordinary consumers' account keeping, and adding machines for these latter, reorganizations in the prepayment collections, and the payment of premiums upon results, the work in departments other than the sales of gas department is now done more efficiently with a staff of 45 less than would have been necessary had the old systems been continued, and the building up of the new staff has thereby been facilitated.

British Commercial Gas Association.

All undertakings in recent years have been compelled by circumstances to be more businesslike and to do something in the way of publicity.

Until two years ago, it was left to individual undertakings to work out unaided their separate schemes of local publicity. Much was achieved by many of them in a very creditable manner considering the disadvantages under which they worked; for advertising has been elevated into a science, and few of us had sufficient knowledge of its principles, or the necessary experience, to enable us to get the best value for the money expended. Now, however, that the British Commercial Gas Association is firmly established, the local efforts of the undertakings are immensely facilitated; for among its objects are included the carrying out of a sound National publicity scheme designed to influence the public through channels not available to individual undertakings, and securing to its members expert assistance and the advantages of co-operative buying of suitable high-class literature for local publicity. Membership of the Association does not relieve undertakings from the necessity of working their districts, but it enables them to do it more effectively and economically than they can possibly do without its aid. The full measure of the usefulness of the Association will not, however, be reached till it embraces the membership of every gas undertaking in the kingdom. All benefit by the work; and therefore all should contribute to the cost. I agree with Sir Corbet Woodall, in his statement at the opening of the National Gas Exhibition, that the Exhibition was not *anti*-electric but *pro*-gas, but would add that the same applies with equal force to the British Commercial Gas Association.

Are There Any Doubters?

It is difficult to conceive that this is the case; but there may be a few amongst us not quite convinced of the advantages of doing more than as little as possible to extend the use of gas within their districts, and may say it means spending money, and what are the advantages? A very proper question, one which has doubtless been asked by those who have already adopted a forward policy, and satisfied themselves as to the necessity and advantage of taking the step. The unconvinced I would ask to realize fully the fact that gas is now subject to competition by a rival full of zeal and not to be despised, and whose success largely depends on taking business from gas undertakings. The same thing occurs to makers and sellers of other commodities. What is the result to these firms? Either they apply more business principles and hold their own, or they go under. Members may easily recall instances of the truth of this. In practice, gas undertakings are always losing and gaining consumption. Those who neglect business principles will eventually lose more than they gain; those who do not, will lose less and gain more—possibly

regaining much of the lost. Is it recognized that a loss of consumption means a loss of profit greater in proportion than the gain derived from an increased consumption of equal volume? Let anyone who doubts the advisability of the expenditure and labour involved in applying business principles take his annual accounts and work out how many items of expenditure would not be any less with a loss of consumption, while practically every item of income would be decreased. As nothing succeeds like success, so nothing continues to fail like failure.

It is obviously impossible to give figures to show the actual financial benefit derived from expenditure upon publicity, as the consumption conserved is necessarily an unknown quantity, as is also to some extent the new business due to publicity, and further that the cost of one year's publicity is not to be put against only one year's profits on the consumption saved and gained, but against the profits of the number of years that such consumption is retained. It can hardly be questioned, however, that good advertising repays its cost. The experience of all the undertakings that have adopted it will, I am confident, confirm this. It has certainly been the case in Newcastle, where the present annual expenditure on advertising is about £1400, which works out at less than ¾d. in the £ on the gross income of the undertaking—a small amount compared with the expenditure of some firms, whose annual advertising accounts often run into such figures as £50,000, £100,000, or even more.

A Good Commodity.

Service and publicity will be of little avail unless we have a good article to sell. We have a good article in coal gas. Notwithstanding competition, it is to-day supplied to over 6 million consumers in the British Isles. The uses to which it may profitably be put are manifold. As an artificial illuminant, it is the cheapest and the nearest approach to daylight; its value as a ventilating medium is recognized by medical authorities; it is reliable, steady, and handy, as by the touch of a button or turn of a valve the lights of a room, house, railway station, and even a city can be instantly forthcoming; hospitals use it for the cooking of food; doctors to heat their rooms; and manufacturers to drive their machinery, or to melt or anneal their metals. This by no means exhausts the uses of our all-round useful commodity; and we may, therefore—provided, of course, that our service is as good as it ought to be—proceed with our publicity, with confidence as to its result.

The Future.

The future of the gas industry is in the keeping of those whose duty it is to direct the policy of the several undertakings; and I ask you to consider what will be the result of the whole industry unitedly going forward on the policy of giving the best possible service to the public, and of bringing to its knowledge the advantages to be derived from the uses of gas. Unity of effort appears to be the essence of the movement; it will be irresistible. Gas undertakings not being in competition with each other, the desirability of combined action upon well-considered lines is very apparent. Co-operation amongst the units spread over the length and breadth of the land will facilitate the dissemination of ideas—the Association forming the connecting link.

Enthusiasm.

Allow me to revert for a moment. I have pointed out that the sales staff must be imbued with enthusiasm. I would like to add that this ought not to be confined to the sales staff but should run through the whole undertaking, commencing at the committees or directors, and permeate downwards. If the men at the top are not enthusiastic, how can those lower down be expected to be so? Enthusiasm at the top would have a wonderful effect upon the chief officials and the whole of the staff, making for that harmony between departments which is so essential for successful working and for the advantage of the undertaking and the industry as a whole. This enthusiasm can be best demonstrated by their effectively encouraging all work which makes for the application of business principles to our gas supply.

APPENDIX A.

WHAT THE COMPANY DOES FOR THE CONSUMER.

Gas supplied in Newcastle and Gateshead at 2s. 1d. per 1000 c. ft., and in outlying districts at 2s. 1d. to 3s. 6d.; all subject, for prompt payment, to discounts of 10% to 25% according to quantity consumed. All gas used in gas-engines subject to 25% discount.

Service Pipes laid free up to 30 feet in length.

Meters fixed free at low rentals.

Gas Lighting Fittings on show, and may be obtained on reasonable terms from the Company or through tradesmen plumbers.

Outside Lamps. High-pressure outdoor lamps fixed free at inclusive rates, for gas, hire of lamps, and all maintenance. Other lamps supplied on hire purchase and cash terms.

Incandescent Burners. Mantles and glass supplied, and burners and glass cleaned; only the materials used charged for at ordinary retail prices; labour free. Calls fortnightly, or more frequent if necessary.

Cookers supplied on hire at from 1s. 3d. per quarter, fixed free; also supplied on hire purchase and cash terms.

Cooker Plate Racks, supplied at from 8d. per quarter; also on hire purchase and cash terms.

Fires supplied on hire at from 1s. 8d. for each of two winter quarters; no charge for two summer quarters, fixed free. All repairs done free.

Also supplied on hire purchase and cash terms.

All fires cleaned annually, and where necessary asbestos renewed, free.

Water Heaters supplied on hire at from 2s. 8d. per quarter; also on hire purchase and cash terms. Fixing may be arranged on similar terms.

Governors for regulating the pressure of gas supplied on hire at small quarterly rentals, also on hire purchase and cash terms.

Wash Boilers, Irons, Engines, Industrial Apparatus, Hot Plates, Boiling Tables, and other Special Apparatus — Supplied on hire purchase and cash terms.

Advisory Staff. Upon personal, post card, or telephone request, an expert representative of the Company will call upon consumers (present or prospective) and advise as to any matter relating to the use of gas. A staff of trained ladies is retained to call upon consumers who have gas cookers and advise as to the most advantageous and economic methods of use.

Estimates free.

APPENDIX B.

OPENING OF NEW SHOWROOMS AT NEWCASTLE.

[*Extract from "The Newcastle Daily Journal" of the 28th of August*, 1913.]

THE USES OF GAS.

NEW SHOWROOMS OPENED IN NEWCASTLE.

UNIQUE DISPLAY.

The Newcastle and Gateshead Gas Company, always enterprising and up-to-date, will to-day open premises at the corner of Saville Row and Northumberland Street, Newcastle, as showrooms, in which they will give practical demonstrations of the many uses to which gas may be applied with advantage in the home, shop, office, workshop, and factory.

One window represents a drawing-room, 19 feet long, artistically decorated in the "Adam" style, with a gas chandelier and brackets, the latter being candle design with silk shades, all fitted with distance controllers, so that the lights may be switched on or off at the entrance to the room. There is also shown a floor lamp with suitable shade, and a gas-fire. The whole of the gas-fittings and the fire are also in the "Adam" design, and all the appliances may be seen in operation.

A bathroom is shown in another window. The bath, basin, and towel rail are supplied with hot water, obtained through a gas water-heater and storage tank combined. This form of water-heater is most suited to those houses which are without any back boiler and circulating tank, though it can be used in conjunction with a back boiler. Adjoining the bathroom is a similar water-heater, specially fitted for show purposes with a hand which automatically turns on and off the hot-water supply.

Entering the showrooms from Northumberland Street, visitors find themselves in a hall or lobby, suitably fitted. From this they pass into a lounge comfortably furnished, in which are to be seen fireplaces with gas-fires. There is also a variety of artistic lighting fittings in operation.

Beyond the lounge a room is fitted up with a variety of kitchen gas appliances. The showrooms also embrace a room on the first floor. In this room is a display of cookers, fires, etc., to suit any home, and artistic lighting fittings from which consumers may make selections. A working arrangement is being come to with tradesmen plumbers, who may also bring their customers to make selections, the fittings being purchased through, and fixed by, the tradesmen. With a view to customers being able to inspect a particular fitting without distraction by other surrounding fittings, a three-sided room has been constructed, and so arranged that any fitting may be hung up in the room, and the customer see the proper effect.

The displays both in the windows and in the other portions of the showrooms will be changed from time to time to show gas applied to various kinds of rooms, offices, workshops, and processes, and at times there will be special displays of particular appliances. Periodically, lectures with demonstrations showing

NEW SHOWROOMS OF THE NEWCASTLE AND GATESHEAD GAS COMPANY.

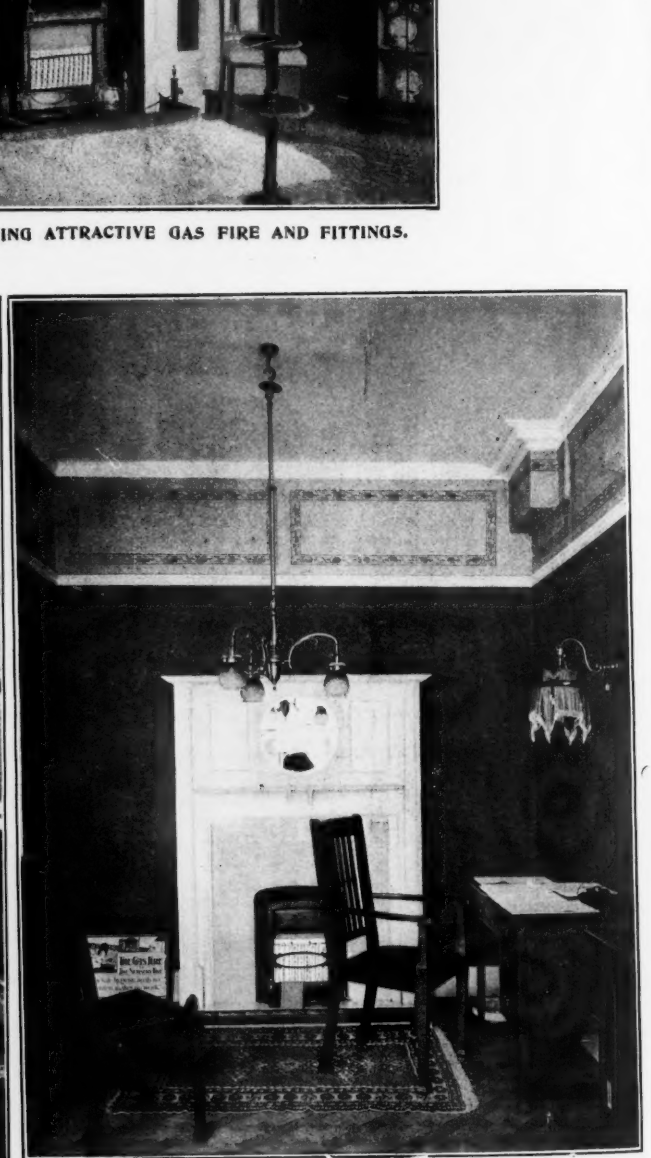
the utility of gas for cooking, heating, ventilation, and workshops purposes will be given.

The furnishing and decoration has been carried out by Messrs. Robson and Sons, Ltd., while Messrs. Emley and Sons, Ltd., have supplied the fireplaces, and Messrs. Shanks the bath fittings. High-pressure lamps will be hung from above the windows outside, but these will not be ready until the middle of September, as it is intended that they shall be of a new design and more economical in working. The public are invited to call and inspect the showrooms, where they will find competent attendants to show the several appliances, and furnish authentic information as to their working. Solicitations to purchase will not be made.

VIEW OF THE SHOWROOM ON FIRST FLOOR (HEATING APPLIANCES SHOWN ON ONE SIDE; COOKING APPLIANCES ON THE OTHER).

MODEL "ADAM" DRAWING ROOM, SHOWING ATTRACTIVE GAS FIRE AND FITTINGS.

THE ENTRANCE HALL AND LOUNGE.



SMALL MODEL ROOM FOR EXHIBITING GAS FITTINGS IN NORMAL SURROUNDINGS.

Discussion.

The PRESIDENT (Mr. Edward Allen): Ladies and gentlemen,—We have just listened to a very excellent paper. It is packed full of wisdom, as well as practical information. I cannot say that Mr. Waddom is one of our very young men; but the spirit of the paper is that of an enthusiastic young man, and I think that we may heartily congratulate Newcastle-on-Tyne on having such a man at the head of their affairs. I must not interfere with the prerogative of those who are going to take part in the discussion. A vote of thanks will be moved by Mr. John Young, and seconded by Mr. Alexander Wilson.

Mr. JOHN YOUNG (Hull): Mr. President and gentlemen,—I consider that we are extremely fortunate in having secured a paper from so well known a leader on gas matters as our friend Mr. Waddom. Long before we had the invaluable assistance of this Association, Mr. Waddom's gas-selling propensities, and his talent for local publicity, were both well known, were copied, imitated, and admired by many of his neighbours. Mr. Waddom has never been content to move with the times. He has always moved a bit ahead

of them; and this paper to-day is further evidence that his spirit is not in any way daunted or dismayed by competition from anything else. Mr. Waddom has laid down for us, in his paper, a clear statement of the policy that should govern the selling of gas and the construction of a sales department. He has also, in a very clear manner, given us a mass of detail as to how he considers such a policy should be carried out. I feel sure that a perusal of the paper will amply repay us. We are all keenly interested in the sales of gas, and a close study of it will greatly help us in our own works. We have always recognized the immense importance of having a sales-of-gas department. The engineer who has, at the same time, the commercial charge of his company, has often to sink the engineer altogether, and allow the sales-of-gas man to come to the top. If I may here refer to the paper for one moment, Mr. Waddom has mentioned that the foremost form of publicity is the satisfaction of the consumer which a good service will secure; and I know personally that the gas consumers in Newcastle are strongly of this opinion, and they are, in themselves, Mr. Waddom's best publicity. I have much pleasure in moving that the best thanks of the Association be accorded to him for his most admirable paper.

Mr. Alexander Wilson (Glasgow): Mr. President, ladies, and gentlemen,—I do not think this motion requires any seconding in a formal way. A paper such as this can only have been brought forward by a man who is enthusiastic in his work; and coming with a long experience of this work and its possibilities, I think we can see from Mr. Waddom's paper that he has taken full advantage of all the possibilities. He has set his house in order in good time; and now he is reaping the advantage of it. Most of us, when we begin to use publicity and advertise, look for the fruits of it too early. We do not give time for the seed to germinate. Town councillors are apt to get rather impatient, and to forget that it takes time to get hold of public opinion and turn it round from the old-fashioned ideas of nasty gas, and to arrive at the idea that gas can be of benefit to the community and to manufacturers. Mr. Waddom puts the case very properly when he says that those at the head of affairs must be enthusiastic. I think it is necessary for those who are at the head of a gas department, if they want it to prosper thoroughly, to "live gas" and "talk gas" all the time. You must not only talk to those who are outside. You have to talk to those inside your works as well; you have to talk over your directors or councillors. You have to talk to your own staff, and everyone you meet. You have to talk gas at every possible opportunity; so that, by so doing, you can put your business on the right rails, and go full-steam ahead. A perusal of the paper we have just listened to will, I am sure, amply repay us. There are so many things in it that one can scarcely deal with it properly at short notice. The point that Mr. Young referred to, about getting increased consumption from our existing consumers, is a most important one. This is a thing which is not so often taken advantage of as it might be. We are anxious to get extra consumers on our books; but if we get extra consumption from the present consumers, we can do the work so much cheaper, and we shall get a lot of advertising mediums through satisfied consumers.

In many districts there have been great difficulties with plumbers and outside labour generally. In Glasgow, it has required a good deal of quiet working to get the thing engineered in the Town Council, so as to induce them to work with us. We are not in opposition to the outside trade at all. But we felt that the outside traders were taking no interest in pushing our side of the business; and as for helping forward the improvement of the gas supply, they practically took no interest in this at all. There was a deputation to the Committee and the Council regarding the matter; and what really turned the scale was sending round to the whole of the plumbers and gas-fitters in the city, and finding out exactly the sort of appliances they had. They were complaining themselves as to the small amount of work they were doing; and we pointed out to them that they were not going to lose business through us, but rather gain. I think it is a help to every gas department to give the outside traders plenty of business and to arrange terms with them. Another thing we have adopted is having bi-weekly demonstrations in our show-rooms for cooking, and explaining our various forms of apparatus there. We get ladies to come. They tell other ladies; and we have passing through the show-rooms a constant stream of visitors who come to see the demonstrations. Of course, when they come there they see all our other apparatus, and ask questions about it; and, in this way, business can be obtained. I think the main point of Mr. Waddom's paper is the question of the education of our staff. This can only be brought about by the process of time. All the speakers, from Mrs. Brereton onwards, have emphasized the point that the education of young gas-fitters is going to help us more in the future than anything we shall get from our old staff. I am sure we shall do very much better in the future than we have done in the past, if we help young men. I think we shall all derive benefit from this paper after we have re-read it carefully. In the meantime, I have much pleasure in seconding the vote of thanks to the reader.

The motion having been unanimously adopted,

Mr. G. Stevenson (Long Eaton) said: Mr. President,—I am very glad indeed to have this opportunity of endeavouring to initiate the discussion on this most important paper. To me, as an old campaigner in selling gas, the spirit of the paper is most refreshing. It shows that the old idea of monopoly is dead; and it would be far better for all of us if the word "monopoly," and anything relating to it, were abolished for ever so far as the gas industry is concerned, because, I take it, we all realize that gas has now entered on a new era, and that we have to take as much pains in selling it as in the making. We have also to remember that we have a duty to the public, as well as to ourselves. I take it that I was called upon to open the discussion simply that I might tempt some of our country friends to take a little part in the proceedings. I am glad to say that my Company, though a small provincial manufacturing Company, was among the first to join the Association. Had the subscription been 10s. per million, we should not have hesitated at all to join just as freely and just as eagerly as we have done. I have nothing but praise for the paper of Mr. Waddom. It is on a very large scale—very much larger, of course, than some of us can ever hope to reach. But the principles, as I can speak to from practical experience, are quite right.

There are one or two points I would like to touch upon; but I shall not occupy very much time, as there will probably be many more speakers to follow. The first point that I wish to mention is with regard to the lady interviewer. Mr. Waddom, in his paper, rightly laid stress on this. It is some dozen years or so now since I started this propaganda work; and it was brought about by a large installation of slot meters in artizans' houses. I engaged a lady interviewer to go round to every house to give instruction, day by day, in the use of cooking-stoves. The immediate result was very beneficial; and the incidental instruction in cooking was a collateral advantage of no mean description. The knowledge of cooking by artizans' wives is very limited, as a rule; and we can do a great deal in this direction, which will eventually pay us handsomely. Another point I wish to make is that I think it is the duty of every gas undertaking to compile a sort of Doomsday Book of their districts—not for the purpose of Form IV., but in order that every house, every shop, and every factory shall be completely scheduled. I have had this system in force for many years now, and find it is very useful to have this little epitome in these days. It is a thing that is very easy of attainment; and by it you get to know how every house is situated for lighting and heating. Also for the purpose of further supply it has its advantages. For one thing, it saves you the trouble of talking to the already converted. Another point is that, in new business, I have found it a very great help to keep a complete record of the equipment. We canvass every house, without exception; and if, unfortunately, people are so misguided as to have electric light, then we get in for some other purpose. But we do make a correct record of every piece of apparatus likely to be used at the present time. This is of great importance. Then, another point is the question of education. It is of immense importance to the gas industry to commence at the bottom, in the elementary schools and the higher grade schools. I happen to be interested in education on local bodies; and I have found some very misleading statements current with regard to gas for lighting and heating. I think this Association ought to be in a position to controvert these statements quickly. Of course, impressions gained by young people are very permanent, and very difficult to remove. Another point that I should like to mention is that in new houses I have gone to the extent of subsidizing builders to

leave a place for gas-fires. It is not always possible to get the builder to lay pipes for a gas-fire. But they are bound to come; and I think it is well worth while to be at some little expenditure in order that, when the time does arrive, the consumer may be readily supplied with a gas-fire. There is no greater hindrance to the adoption of gas-fires than having to pull a house to pieces. I may say that I have spent some hundreds of pounds in this direction; and it has all come back, time after time. My final point is that, in these days of very keen competition, it is not only for us to sell gas, but we, as gas engineers, ought to remember that our ideal should be to send out gas of constant quality and pressure. It is of enormous importance to know your supply does not vary more than a little from day to day.

Mr. W. Titley (Guildford): Gentlemen,—The point that I want to bring out is this: There are a great many here, directors and others, besides the officials of companies; and what I wish to say is that there is a great deal of personality in this work. It takes up a lot of time; and I think one of the things that we ought to see to is that those men who are engaged in it are properly paid. I should like to ask Mr. Waddom whether he finds much difficulty in getting good gas-fitters, and whether he upholds the principle of paying the men well who attend upon the consumers.

Alderman W. Armitage, J.P. (Doncaster): Mr. President,—I have listened with delight to the very practical remarks made by Mr. Waddom in his paper, as one coming from the North. There is an idea that has not yet been expressed, and which I will venture to submit to you, though it will not come from so far north as Newcastle-upon-Tyne. It is this—every man thinks he has solved the problem, and that he carries with him something that will settle every vexed question. Now, I thought that I had got hold of the thing, and no one has yet referred to it—viz., the one word "monopoly." Why should we bother ourselves about advertising when we command the whole situation? The public must have gas. Then there immediately comes up another word, and that is "price." I am glad to see my friend Mr. Watson here. He is an excellent Manager. He has not been quite so long in Doncaster as I have, because I have been there 40 years; and I have been 27 years on the Corporation. During this time, I think I have voted four times for a reduction in the price of our gas. I have just come to the conclusion that the solution of this question of the sale of gas, and indulgence in propaganda work, would be greatly facilitated, if not settled once for all, if the various corporations and companies could bring down the price of their gas. This is a question of policy which corporations have to do with, and companies also. Mr. Waddom, in his excellent paper, did not enter into the question; but I do think that the greatest of all missionaries, and the best of all commercial travellers, would be the man who could say: "Our price is 1s. 9d.; whereas our opponent sells his gas at 2s." As I say, I think he would be the successful traveller, and would sell the most gas. There is another thing, and that is that I have always been a great believer in the man at the top. Was it not Horace Greeley, when people made applications to him when he was President, who said: "Go west; display your prowess and your indefatigable ability westward?" Of course, it always damned them. As I say, I am a great believer in the man at the top. Still, at the same time, the man at the top cannot do everything. What we want to do is to get efficient men who can be at every point of the compass. If we had this, no doubt the sale of gas would be considerably increased. Some people seem to think that the men who go to the university and receive a scholastic education are the most fitted for commercial life. I have myself great doubts of it. I do not know whether Mrs. Brereton did not refer to this topic. In this connection, I am rather reminded of the father who had a son who, of course, was going to distinguish himself, because he had had a university training. There was a great deal of talk at the time, on this topic, about technical schools, and the man wrote to "The Times" saying: "If I want my son to be in business, I will put him in business." I have very much doubt whether a man who can speak a little Latin, and less Greek, will acquit himself in commercial walks of life to any marked degree. I think it wants a man to understand fully the particular article which he has to sell; and if he could read the minds of the people he was dealing with, it would be so much the better. Phrenology would come in there. I think that is the class of man who would effect a greater sale of gas than, perhaps, the man who had been more highly educated. At the same time, I was very much struck, when reviewing the paper as a whole, with its eminently practical character. I think if a great deal of what it advocates could be carried out, it would do good in our various spheres of operation. Of course, it is the question of price that bothers corporations and companies from time to time. You all know that not very far from where I am living they are selling gas for about 1s. per 1000 cubic feet. I am referring to Sheffield. Now, I contend that the price at Doncaster is very reasonable—namely, 2s. 2d. per 1000 feet for illuminating purposes—and I think in Liverpool it is 2s. 1d. But this, of course, is a question with which Mr. Waddom had nothing to do. I think that if the various companies and corporations were to consider the question of price, this would be a thing which would have more to do with increasing sales than anything else. I have been very much pleased with the paper.

Mr. Goodenough: Mr. President, ladies and gentlemen,—I got up, first of all, to pat myself on the back, because I feel that a great deal of credit is due to me for having persuaded Mr. Waddom to read his paper. That gentleman, with his natural modesty, was very averse to undertaking the task. But the result has much more than justified me in my persistence in pressing him to do so. And I should like, here, to pay my tribute to the comprehensive and thoroughly practical character of the paper from end to end. In the pressure of work, during the last week or two, I have not had an opportunity of making myself acquainted with the contents of the paper until Mr. Waddom was delivering it; and I was very glad that I had not, because it came fresh to me. I feel that the Association has now got on its records a paper that will prove a mine of valuable information, assistance, and inspiration to the members for many years to come. I do not want to take up a lot of time by going through the paper and merely saying "Ditto" to Mr. Waddom, as I am able to do on every point on which he has touched; but there are one or two things that I should like to emphasize.

One is that I was glad to see his strong reference to the profit to be derived from increasing the consumption by existing consumers. This is a point I have been trying to drive home into the minds of my own staff for years past—that if you have the mains laid, and the services laid to the houses, and the meters fixed, you have very little extra capital required there. If you can only add to the number of fires in the house, or add a water-heater, the profit on the gas you sell in the house will be twice as much per 1000 cubic feet as the profit you will get on new buildings where you have to lay your mains and services, and, perhaps, as Mr. Stevenson has said, lay out money on canvassing work. This is a point most managers are fully alive to. If the paper does arouse in the minds of managers still more attention to this question of increasing the consumption among the existing consumers, then it will have achieved a great deal.

Yesterday, one of the speakers (I think it was Alderman Armitage) referred to the question of why No. 24 in a street failed in business while No. 25 succeeded. Another question that a gas manager might ask himself is: "Why does No. 24 burn 100,000 cubic feet of gas a quarter, while No. 25 burns next to nothing?" It is of great value to the district representative to go carefully through the records of his individual consumers and compare the consumption in houses of a similar character, noting that one is burning so much more than another; and then he can set to work to bring all consumers, in like circumstances, up to the level of the best results that he has got. A systematic examination of the accounts in a district, and a persistent attack on the weak spots, will have a wonderful effect in bringing up the average consumption in the district; and it will have a still greater effect in bringing up the profit. Mr. Waddom made a parenthetical remark in his paper which showed very clearly the thoroughly sound commercial principles upon which he works. He said the consumer's meter-card should be closely examined, and where the consumption is normal, whether just above or just below the consumption of the previous quarter, the matter should be investigated. That is to say, Mr. Waddom believes in looking after his consumers' interests, as well as looking after what is more directly to the interests of the undertaking; and I am quite sure it is a profitable thing to do to show your consumers

you are keen to save them from waste or loss through some abnormal escape as it is to show them you are keen to look after your own interests. Such things have occurred as finding that there is a large escape of gas from a decayed pipe passing (say) through a chimney, by which a consumer might be losing 1000 cubic feet a day. Such a waste as this is of no advantage to a company, because it only means a dispute in the end; and the sooner it is discovered by the gas company's representative, and the fact brought to the consumer's knowledge, the better. In the same way, if a servant is extravagant, the sooner this can be put an end to the better for the undertaking. There is an illuminating passage in the paper which shows the soundness of the principles on which the gas department in his Company is conducted.

Then Mr. Waddom also made the remark that the work should be carried out in all cases to the satisfaction of the consumer; and I would here refer to the advantage of inquiring from every consumer for whom you instal apparatus, after a suitable interval, whether the apparatus is giving satisfaction. I introduced this system some time ago in my department; and some of my men said it was asking for complaints. My reply was: "Of course, it is. If the complaints really exist, the sooner we know of them the better." And, as a fact, we do find that inquiring whether apparatus is giving satisfaction leads to some complaints being made; but it is so much better to have them cleared up, and the consumer satisfied. Another thing is that we do get from it testimonials which are most valuable for publicity work. We send a reply post-card for an answer to our inquiry, and by this means we get a regular harvest of testimonials which we are able to publish as a means of persuading those who have not yet gone in for gas fires, or heaters, or cookers, as the case may be. Mr. Waddom has referred to the difficulty of having an organized "complaints staff"—experienced in getting to the root of things. These words need to be underlined. Complaints should always be made the source of education for the staff and for yourself, in finding out what is at the root of the complaint, in order that you may dig up the root, and thus avoid the recurrence of such complaints in the future. Then Mr. Waddom refers to the advantage of a well-stocked library of books for the staff—a subject to which Mrs. Brereton referred yesterday. The President suggested to me—and I think it is a most admirable suggestion—that the Association should prepare a list of books that could be recommended for this purpose. I should like to say to all present (as we will say by circular later) that we shall be glad to have from all the members suggestions as to books that they have found useful for the information and guidance of their staffs. I do not mean only books on gas supply and technical subjects, but books on business principles and the application of fundamental principles to business, which any members may have found useful. I will mention one that has nothing whatever to do with gas; and that is a book called "The Letters of a Self-Made Merchant to his Son." This book is stuffed full of common-sense put in the most interesting and entertaining manner; and it will be read by a junior member of the staff whom you could probably never persuade to read a solemn treatise upon business principles.

Then Mr. Waddom later on dealt with the question of lessons on salesmanship and the training of the staff. By salesmanship, Mr. Waddom, I know, does not only mean education in the technique of gas salesmanship, but training in the principles of salesmanship as they apply to any business anywhere. This is what we want to educate our men in—namely, the fundamental principles of equitable, and therefore successful, commercial enterprise. You can talk upon salesmanship by the hour without ever mentioning the word gas, and yet do a very great amount of good to the staff who have to sell the gas. In this connection, Mr. Waddom's remark as to the training of the rental department is a very wise and sound one. An American once said that he had been connected with over 120 gas undertakings in one way or another; and he had never yet met one where the work done on the district by the trained representatives was not more or less discounted by the uncommercial methods of the inside staff. There is no doubt that, if there could be an interchange of *personel* between the indoor and the outdoor staffs, so that the men who have to deal with the public in the office will also know how they can be dealt with on the district, the points that arise, and the difficulties that have to be encountered, and if the men on the district also realized the difficulties of the men in the office, great advantage might accrue to both departments in the undertaking they represent. There is one question I should like to ask Mr. Waddom, on a matter of detail. He mentioned that there are four district representatives and 30,000 consumers in a certain area. I should like to know what proportion of these 30,000 are slot consumers, and what proportion are ordinary consumers, because this makes a great deal of difference in the staffs required. Though I should not say that slot consumers do not require attention from the sales department, every company will find it a profitable thing to inspect and overhaul the installations in the houses of prepayment consumers periodically, because the poor consumer to start with in many cases hesitates to complain. The working men's wives—some of them, at any rate—are not fond of going into a big formidable-looking building and lodging a complaint of some defective gas appliance to a black-coated official whom she may think considers himself a superior person; and it is our experience that you will find gas installations in the houses of the working people in a deplorable and absolutely unusable condition remaining out of use, and thus your capital lying idle, for the want of inspection and overhauling of the appliances in respect of which the consumers never complain. One consumer moves out and another moves in, finding everything unusable. It has never, perhaps, been used at all. He is not accustomed to burn gas, but uses lamps and a coal-fire, whereas he might make use of a gas-fire if only it were in a proper condition. This is a subject which managers who have anything to do with the slot system will appreciate.

Alderman Armitage referred to price as probably the one factor in increasing or maintaining the sale of gas. I yield to no one in my desire to have a low-priced gas to sell; but I do not believe price is the only, I do not believe it is in many cases even the main, factor in the successful increasing or maintenance of the output of gas. I believe gas at 3s. per 1000 cubic feet, with thoroughly efficient and businesslike service, will be sold more freely than gas at 2s. 6d. with a bad service. I would strongly urge managers who have gas at a low price not to rest upon this foundation only, but to realize that, if they will give good service as well as a low price, they will get a very much bigger increase in sales in their districts. And I would say to those managers who, owing to local circumstances, are obliged to charge a higher price, not to despair, but to realize that if they will only serve the public in a commercial and businesslike way on the lines well laid down by Mr. Waddom in his paper, they have undoubted possibilities of large sales even at a high price; and then they will be able to bring about the desired result of reducing the price by having increased sales. I am sorry to have detained you so long; but the subject is one of such interest, and the paper was such a delightful one, that I am afraid it has carried me away.

Councillor SQUIRE (Belfast): Mr. President,—I do not rise to make a speech, but only to put forward one remark. I am going to follow Alderman Armitage to some extent, because he has spoken as a layman, exactly the same as I am. We are almost overwhelmed, and rightly so, in such a congress as this, by the expert gentlemen; but we want to have a look in to say to the author who has given us such a splendid paper, that he has addressed it to the business men to whom he referred in the last part, who have simply to sit at a table and practically accept all the suggestions made by their clever engineers. This is my position with regard to Mr. James D. Smith, our efficient Engineer in Belfast. I think, gentlemen, that as England and Scotland have both had a look in, it is time Ireland had some say. However, I said I was only going to make one remark, and I want to say to the author that he has undoubtedly given in his paper to those of us who are not practical men something to take home and to speak to our consumers about. He has given us some really business, practical, everyday things to think about; and one of his great thoughts, to my mind, at any rate, is the question about the ladies. I am very much inclined to think there is a great deal in it. After all, it is the women of the house the people have to go to see and talk to; and who can do it better than a lady? I have a very strong view on this point; and I am glad to be supported in it. The question of the fittings is a very interesting one. We have been overruled by those who sell fittings. I do not think we are right, because I think the fittings ought to be under the supervision very largely of the gas committee. To-day I saw a paragraph in one of the

papers about somebody being poisoned by gas. I do not know whether it was done purposely or not, because anyone can be poisoned by gas where the fittings are bad. Cheap fittings are worse than cheap gas. I am not sure that any of us supplies cheap gas in the sense of its being bad gas. The price at Doncaster and at Sheffield has been mentioned; but we can beat the whole lot, because our price is only 1s. 9½d., and we have to get our coal from England. We give the very best gas, and see by testing it three times a day that it is kept up to the best condition. There is one thing more I must say before I sit down. If there is here anyone who does not belong to the Association, I would recommend him to take this paper home, and see what are the advantages of joining the Association. I should like for just one moment to refer to what Mr. Young said, when he spoke about what I may call the freemasonry of the gas business. I have been in England, Scotland, Canada, and America; and everywhere I have gone there is free *entrée* into the gas establishments, and they will show everything they have. If you go to Mr. Young at Hull, you cannot have a better illustration of what a gas manager will do for you; and I wish to take this opportunity of publicly thanking him for what he did for us last year.

Mrs. CLOUDESLEY BRERETON: Mr. President and gentlemen,—I wish only to raise one or two points in connection with Mr. Waddom's paper and what I said yesterday. I feel it necessary to tell you I had not read Mr. Waddom's paper before I read my own. This is the first time I have seen it. Some of you called me an idealist yesterday. Now you are met by Mr. Waddom telling you that he has been doing just what I suggested. I want publicly to acknowledge what we owe to Mr. Waddom. If we want anything for the "Bulletin," I have only to write to him, and either he does it for me or he gets his staff to do what I want. It is just because, being a busy man, he is also a business man. He has already shown you that he is a business man by telling you how things may be run with half the stock. With regard to the suggestion I made yesterday about providing libraries for the young men, Mr. Waddom is already doing this. As to the suggested list, I hope you will all take it up and do it. You remember I spoke about a small nucleus of a set of domestic books. When I wrote my paper, I had drawn up as an appendix the books on domestic subjects I thought could be obtained for £5. I hope that you will all let me have as soon as possible any suggestions you have to make in regard to other books that would be useful. In reference to business systems, I can say from my own investigations that Mr. Waddom runs his business in a most up-to-date way, with a card-index that anyone might be proud of. No doubt many of our gas men are overwhelmed with work; but they might take example from what Mr. Waddom is doing, and save themselves a lot of worrying routine, and so on, by adopting modern methods.

There is one point that greatly appeals to me. Mr. George Stevenson said he hoped we should in the future deal in a scientific way with the education question. I feel this is one side of our work which we are doing very well, and which we cannot brag enough about. The work in this connection was started first by the Gaslight and Coke Company, in their generosity, before this Association was formed; and the enormous effect it has had on the teaching world in England can hardly be gauged. You will remember that at the last annual meeting at Sheffield of Domestic Science Mistresses, on account of some articles I had written, I was invited to find some man to go down and lecture for us, provided he did not talk gas. Dr. Rideal did just what was wanted very well. In addition to this, we circulate papers on educational matters among all the educational authorities in the country. We do not make any fuss about it. We do it quietly. We find out who is the right man to send it to. We do not just send it to a secretary for education, and trust to luck that it will not go into his waste-paper basket. We find out the right place to send it, whether it is the secretary, the chairman, one particular councillor, or the head of a technical college. We send it to the man who matters; and they all take it up. We send to him personally by letter any information he requires to help him to understand the scientific matters. We do not send anything with reference to trade matters. Take, for instance, Mr. Michael Sadler, of Leeds. We have letters from him thanking us for what we are doing. In connection with this we had the chief man of the London County Council Education Department, and also the Board of Education, at our luncheon here when we opened the Exhibition. We had Dr. Gardner and Dr. Kimmings, who was sitting here listening to Professor Lewes's lecture, and tremendously interested when he was talking about the impurities in the air, because one of the hobbies of Dr. Kimmings is taking chemical tests of the upper air of theatres and other places of amusement. He is a lecturer on chemistry and a doctor of science, and this is his amusement. We have tried to let these men see both sides of the question. As officials, they often have to be very careful in offering opinions. Then, again, at the reception last night, we had some of the most distinguished women on sanitary matters in London. One of the Sanitary Inspectors of the City of London brought with her a friend who had just come from Australia with the object of making notes on sanitary matters. I think this side of the education work is extremely important. We do not want to advertise these things in the Press, because it is not politic.

With regard to what Alderman Armitage said this morning, that I had brought forward in my paper yesterday the suggestion that university men were the best for commerce, there has been a very long correspondence going on in "The Times" and elsewhere on this particular question; but I should like to make it quite clear that I did not say university men were the best for commerce. I should be very sorry to say this. What I did say was that, for your chief salesman consultant, and probably for your district men, you could not do with the ordinary grown-up shop assistant; and I still say so. You could not have anybody for your chief salesman consultant under the rank of Dr. Rideal. If you do, you are going to damage your industry. He has to be a chemist from the point of view that he may have to take up any one of fifty different scientific ideas. He may not have learnt the science of malting in the university; but if he has taken the science degree, he can in an hour get up for the purposes of the gas industry what he wants to know about the application of gas for malting, better than any young man who has started from the lowest ranks in scientific training. Then, again, I did not talk about university education for gas-fitters. I know too much about education to talk such nonsense. I have in my time seen too much of the evil of giving the wrong type of education. I am not saying that we should bring in university men simply because they are university men, and put them in the top jobs. I am going to leave that side of the question to be discussed by Sir Alfred Keogh, who, as the head of the Imperial College of Science and Technology, is dealing with the relations of science to industry. I would only protect myself by saying that I was not talking about science degrees for gas-fitters.

Mr. WADDOM: Mr. President and gentlemen—I am afraid we are not behaving very well to Mr. Broadberry, who is down to read a paper before luncheon; therefore I will say but very few words in reply. I sincerely thank you all for the flattering words you have uttered on this occasion; I confess I felt very pleased when the Executive asked me to read a paper. I certainly did try to get off doing so; but, after all, I am gratified at the way in which you have received it, and should be more than pleased if it helps you in any way. In reply to Mr. Goodenough, I might say that we are nearly equally divided between slot-meter consumers and ordinary consumers. There are a few more slot-meter consumers than ordinary; but it does not follow that the slot-meters are equally divided over the poorer districts. Some are in the more industrial districts, where better rents are obtained. With regard to the suggestion about undertakings providing libraries for the use of the staff, I am pleased to hear the Association will probably help us in this direction. I do not mean providing us with books for nothing; but perhaps they will be able to let us have them on co-operative lines, because they can buy them much cheaper than we can. As to the price of gas, I wish entirely to associate myself with the remarks of Mr. Goodenough—with the reservation that you very often have to have a cheap gas when you are dealing with an industrial business. The companies cut the cost in manufacture to the lowest possible price; and unless you have reasonably cheap gas, I am afraid you will not be able to do very much with them. With regard to what was said about a Doomsday Book or card-index, I think that is already done. We make the greatest possible use of our meter-reading cards. One-third of a large card is taken up with a statement as

to what they have in the house that is being supplied by the particular meter, how long they have had it, and any further information necessary. Then, again, all the information we can gather on the district is kept for future use. Of course it will not be complete for some time. We can turn up a large proportion of our consumers and see who they are, and what gas they are consuming. I think, if I were asked what I considered the most important part of my paper, I would say, without hesitation, that you should give good service. It all hangs upon this. If you give good service, and concentrate your energies on the retention of business, every consumer you retain helps to get a new consumer. I thank you for the way you have received my paper.

HOT WATER SUPPLY AS A FIELD FOR INCREASING GAS SALES.

By A. E. BROADBERRY, Assoc.M.Inst.C.E., of Tottenham.

The task of writing a paper on the above important subject was, I believe, given to me by the Committee because it is a subject on which I am still whole-heartedly on the side of gas. I say this, because many of you are aware that the Company which I have the honour to represent has ceased to be merely a gas company, and is now to be known as a "Light, Heat, and Power Company," embracing electricity within its sphere. Although, consequently, I may sometimes in future be found metaphorically "sitting on the fence" in regard to certain subjects, I assure you that, in regard to water-heating, I cannot find a tenable position for any part of me on the electric side. I am, however, running ahead of myself; my task is to show how to increase gas sales. I ought first to prove that there is a growing demand for hot water, that a constant supply of it is practically an essential of comfort in every modern home, in every hotel or boarding house, restaurant, café, or shop, in every factory and workshop, and, in fact, in almost every place where civilized man, woman, or child lives, moves, and has its being. I ought next to prove that gas is the ideal agent for producing hot water at will at any temperature from normal or natural up to boiling point; and to complete my three heads of discourse, I ought to show that, by proper organization, this ever present want can be materialized into a demand for apparatus whereby the want can be supplied. Then finally to harmonize and connect the deductions under the three heads, I ought to endeavour to show how well the work can be done by large organizations like gas undertakings in a way that would be impossible under any other system or *régime*.

The Demand for Hot Water.

Firstly, then, let us consider whether or not there is a growing demand for an ever-ready supply of hot water. The easiest way to demonstrate this is to enumerate some of the regular uses of every-day life in any modern household. I start the list with the early cup of tea for the working man, to give him comfort and warmth before leaving home for his work at five o'clock or half-past. Then there is the equally invigorating cup served in the bedroom for his more favoured fellow mortals who do not have to start quite so early. Next come the warm early-morning bath, shaving water, and jug or can of hot water for the bedroom. In the kitchen there are preparations to be made for breakfast, hot water for tea or coffee, eggs to be boiled, and hot water wanted for washing-up, and the dozens of daily culinary operations. During the morning, perhaps, baby's bath has to be provided, hot water is wanted for scrubbing floors or washing small articles which do not go to the laundry, or are not reserved for the weekly wash-day. Then come luncheon preparations, and more washing-up; then afternoon tea; then dinner. Perhaps unfortunately illness or accident may occur. All this involves a need for hot water to be readily available at all sorts of intermittent times, in quantities varying from a cupful to a hot bath. As it is with the home, so it is, but to a much greater extent, with hotels, boarding houses, and almost all kinds of business establishments; and in all cases the demand is a growing one. Time was when we had to go without the luxuries and comforts which now, by custom, are becoming necessities. Forty years ago few houses were fitted with hot-water supplies, and many of them had no bathrooms. Now all have to be so fitted; and as facilities for obtaining hot water increase, so the comfort and convenience it brings render it a more essential factor in the well-being of the community. All this, and much more, is so self-evident, that I feel I have said enough to establish the first point I want to make—namely, that there is a growing demand for an ever-ready supply of hot water in varying quantities.

Coal, the Household Demon.

Now I will turn to the consideration of the second point, as to what is the best means of securing the fulfilment of this established want. My reason for having said that I cannot support an argument for heating water electrically is that, though high efficiency can be obtained by good electric apparatus, the heat equivalent of an electric unit is only 3412 B.Th.U.; and even at the low price of 1d. per unit, that is out of the question against a pennyworth of gas at 2s. 1d. per 1000 cubic feet (the Tottenham price), which equals 40 cubic feet, containing 19,000 to 20,000 B.Th.U. net, or 21,000 to 22,000 gross. So far as water heating is concerned, it is the gross heating value only that matters. So the choice lies between coal or coke and gas fuel. For years coal had the field almost to itself; but its time is passing. I do not claim to be a prophet, and there is but a very small element of prophecy in my saying that the use of coal as a domestic fuel is doomed to rapid disappearance, for its doom has not only commenced, but is well on the way to successful accomplishment. The coal merchants know this only too well, and in their despair about three months ago they sent out a mendacious circular, which was like the wail of a dying demon. I think everyone will agree that coal is indeed a veritable demon in the refined modern household, from the time it is being carried clumsily in and shot into the cellar, leaving its marks everywhere, to the time when it makes its murky exit up the chimney. We all know how the maids dislike having to go to the cellar, generally a black and dirty place, and all "cobwebby," to fetch up coals; how horribly the small pieces crunch underfoot after being split along the floors; what an unpleasant job it is to lift it from the skuttle, or coal vase, or cabinet—for whether that operation be done with scoop, tongs, or mittens, it is the same dirty task. Neither is there much joy for the maid who has to clear up the ashes and clean the grate, and get the fire lighted and burning well in the morning before there can be any hope of getting a move-on the water in the kitchen boiler and circulating pipes.

I am dealing with a hot-water supply only, so I will leave out the work and woe it brings in other parts of the house. Sometimes the kitchen fire will not burn, and the maid loses time which she should spend cleaning the room and preparing breakfast. Bath water, washing water, shaving water are all delayed, and the day starts unhappily. The tale of indictment by which coal is being doomed is not yet complete. The kitchen flues have to be frequently cleaned, or the water will not heat at all. This is another nice job for the maid, which she rarely does either willingly or thoroughly. Then, when the chimney gets foul, the unwelcome sweep has to be called in. Add to this the dustman, who has his periodical turn in clearing away the dust and ashes, probably accidentally spilling some all around. The coal store next becomes empty, and again the coalman must come along. Finally, smoky chimneys and smoky skies complete the gloom surrounding the use of coal.

The Inefficiency of Coal.

I have, however, so far only spoken of its unpleasantnesses, and have not yet touched on its deficiencies as an agent for heating water. These are chiefly that the quality varies, and, for the sake of offering something at a cheap price, rubbishy material, which will not keep a good, steady fire, is sold by the coal merchants. This is perhaps the worst mistake those purveyors of dirt, dust, smoke, and soot ever made. The bad fuel has to be poked and stoked to keep it alive; and even if its price is low, it is, apart from the labour and mess, the most costly as regards efficiency. But even given a good coal that will always keep a good fire, in order to ensure a supply of hot water being always available, the fire must be kept going all day at its full heat, even though only a jugful of hot water may be wanted every half-hour. Most of the heat in such a case is wasted up the chimney, especially when the flues are dirty. Water is not always wanted at the same temperature, nor in the same quantity; but really hot water may be required at any time, and, to secure this with coal heating, there can be no lowering of the fire. Lowering a fire, or quickening it, takes a considerable period; and its efficiencies cannot be timed to

coincide with water requirements, which are often irregular and impossible to foretell. By facing the waste of a constant fire burning for all it is worth throughout the day, a reserve of really hot water may generally be maintained. But let us now consider what happens when an extra and sustained demand is made on the supply—say, two or three hot baths wanted in quick succession from an ordinary house supply. The result is that the first is hot, the second warm, and the third cold. The coal system, therefore, at its best is inflexible in the direction of more power to meet a sustained demand; while, between the periods of demand, its energy is being wastefully spent for naught. Against these drawbacks and inefficiencies, gas surely has an easy task. Changes take place slowly. Gas engineers and gas managers, and I will venture to include boards of directors and gas apparatus manufacturers, were not quick to avail themselves of the opportunities offered by the unsatisfactory conditions of the coal-heated water supplies, and consequently the public have not realized the potentialities of relief and improvement which gas possesses for the purpose.

Advantages of Gas.

The first gas-heated instantaneous water heater of the "direct" or "open" type was placed on the market about the year 1870; and for thirty years the progress was very slow, although in the meantime—in 1886—the first "chamber" or "closed" type made its appearance. Gas in itself as a fuel is absolutely clean. Unlike coal in every way, it is delivered silently and unseen as required; untouched, it flows where it is wanted, and as fast as it is wanted. It can instantly be brought into full effect when lighted, and be as instantly stopped when its work is finished. It can be exactly regulated to any required work, and can be left with the certainty that it will remain constant without any attention until the next desired change. Its flexibility as a water-heating agent is therefore infinite. I believe I am right in saying that the Gaslight and Coke Company were the first to offer facilities for the renting and purchase-hiring of water-heating apparatus to their customers, and, as the consumers gradually learnt the immense advantages of the system, they have availed themselves of them increasingly year by year. Many other companies are now doing the same service for their consumers. The apparatus manufacturers in recent years have actively dealt with the problems of varying requirements in so able a manner, that there is now a large choice of apparatus on the market, high in efficiency and capable of dealing with any kind of demand that may arise.

Types of Water-Heating Apparatus.

The various types of water-heating apparatus may be generally described as follows:

Circulators.—These may be used in cases where it is considered desirable to keep a stock of hot water throughout the day, as is done with the ordinary circulating system worked by the kitchen fire. The superiority of gas over coal fuel consists in: (*a*) The full heating effect being given as soon as the gas is lighted; (*b*) the consistently maintained heat without further attention; (*c*) further also in the fact that, as soon as the desired standard of heat (which may be set to any requirement) is attained, the supply of gas is automatically cut down by the thermostat valve to just what is required to keep the standard level—always automatically responding to necessary variations when water is drawn off. Here indeed is a tough task for emulation by coal-fired boilers—one that they really cannot perform. In fitting this system, the circulating pipes and storage tank must be lagged to prevent waste of heat, when it will be found that the automatically regulated use of gas in many cases renders it cheaper than the unregulated coal fire. In houses already fitted with hot-water supplies from the kitchen boiler, in most cases the hot tank is fitted high up in the house. But so long as the pipes are well lagged, this type of water heater may be fitted as an auxiliary to the coal fire; and in many cases it will be found that the fire is abandoned and the "auxiliary" does all the work—at least, that has been our experience. In more modern installations, the hot tank is fitted near the kitchen boiler. This system is particularly serviceable for gas circulators where no hot-water system has previously existed in a house. The hot storage cylinder or tank is placed close above the circulator, so that the circulation is very short, and either a secondary circulation can be led from it, or direct supplies may be run to any point below the cold-water main supply cistern. In other cases, the storage is contained within the apparatus itself, and hot water drawn direct to the points of consumption.

Geysers.—This name was given to instantaneous water heaters by Maughan, the first inventor, in 1865, and has become a generic term. There are two types: The cheaper is the "open" or "direct," in which the hot gas fumes come in contact with the water. This type is highly efficient, and the water is quite suitable for baths, scrubbing, and similar uses, but unsuitable for culinary or drinking purposes. The "closed" or "chamber" type is somewhat dearer; but, as the water does not come in contact with the gas fumes, it is suitable for all purposes, and this system is therefore to be preferred. Unlike circulators, which use atmospheric burners, geysers are fitted with luminous flames, as the gas is required to be suddenly lighted, and might "light back" if atmospheric burners were used. For ignition purposes a pilot flame is used, and the gas and water cocks are made interlocking, so that, unless the water be turned on, the gas cannot be lighted. With this type of apparatus a stream of consistently hot water can be obtained for any length of time. Any number of successive baths, for instance, may be had. This is another impossibility with a coal-heated water supply, and the position of the dying household coal industry becomes more and more melancholy as the advantages of the geyser become known. Usually this apparatus is fitted in the bathroom over the bath itself, and other points such as the lavatory basins and scullery sink are left dependent on the circulating system for their hot water supply.

But even this one single grain of consolation for the coal merchant is now gone. I am able to say this because of the latest development of the geyser, by which it can be fixed in the scullery itself and connected with the whole system of house piping. The gas valve is operated by the water pressure in such a way that whenever a hot tap is opened in any part of the house, the gas is immediately turned full on. It is lighted by the constant pilot flame, and water to any temperature (up to nearly boiling) can be obtained by regulating the rate at which water is drawn.

This, to my mind, is perfection of hot-water supply. Let us imagine boiling water being wanted hurriedly—say, for making a quick tea. There is no waiting for the kettle to boil. It can be filled at the scullery tap with water nearly boiling, and finished in a minute on the gas stove. This is, I think, a typical instance. The only fuel wasted is the small quantity used by the constant flame kept for lighting-up when hot water is wanted. The hypercritical may raise the objection that the water standing perhaps for hours in long lengths of pipe to distant points becomes cold, and has to be run to waste before the flow of hot water heats the pipes and reaches the distant tap. A further objection might be made that, after use, the heat of the water left standing in the pipe becomes gradually dissipated, and represents waste. This in practice is nothing compared with the economy of using practically no gas except when hot water is being drawn.

Other types of water-heaters are made whereby the water can be heated in bulk for bath and other purposes. By this system the water can be brought absolutely to boiling point. Then there is the wash-house copper, which does away with all the old troubles, such as "skying the copper" with gunpowder because the fire won't burn. Other water-heating appliances exist for heating conservatories containing choice plants; aviaries in which rare and valuable birds are kept; garages with expensive motor cars; and innumerable other purposes where absolutely reliable, regular, and constant warmth is essential without trouble and labour. All these purposes are served by gas in a way coal cannot hope ever to approach. Two principal points for giving complete satisfaction must be borne in mind—namely, always have an efficient flue, and always have a gas supply, both as regards service and meter, equal to the greatest demand ever likely to be put upon the apparatus. As regards efficiency, some 80 to 90 per cent. of the gross heat value can be relied upon when the apparatus is properly installed; and, as over 20,000 heat units can be had for a penny, it follows that a 40-gallon bath can be raised nearly 40° at that price at 80 per cent. efficiency. It will be noted that I have spoken of the gross value. Usually we speak in British thermal units net; but for water heating and many other purposes it is the gross that matters. Indeed, some experimenters working water-heaters at their most efficient rate and under the best conditions, by erroneously basing

their calculations on the net heating value, have obtained apparently over 100 per cent. efficiency, which is naturally an absurdity.

The foregoing brief description of the large and varied choice of apparatus which the manufacturers have put upon the market shows that, although they were slow to start, they at least have realized what an immense field of usefulness is maturing for a rich harvest.

Pushing the Claims of Gas.

The apparatus being available, my third point is to show how the need of the community for a convenient and cheap hot-water supply may be made into a demand for the apparatus. This work lies chiefly with the gas companies and the gas officials. They ought not to miss any opportunity of placing the benefits of the gas systems before their customers. A great work has been done by this Association, a work which is making its effect felt in every quarter of the globe. But the individual member, whether he be director or official, must not be satisfied to leave the good influence of the Association's efforts to do all his work. The Association cannot arrange with his individual consumers. Public attention has been gained, consumers are ready now to listen to him, and it is his part to give facilities to them for testing our claims for themselves and gaining the conviction which is sure to follow. One of the finest ways of doing this that has come to my notice is the method adopted by the United Gas Improvement Company in Philadelphia. On March 15 of this year they advertised in a Philadelphia paper as follows:

FREE TRIAL.

An interesting offer to our Philadelphia consumers. We will let you try in your own home for a few months an

Automatic Gas Water-Heater.

This is the wonderful modern heater which combines convenience, service, and economy. Turn the faucet, the gas-burner is lighted automatically, and the water comes out piping hot. Close the faucet, and the gas is turned off automatically. Expense ceases. A marvel of modern invention which adds comfort and economy to housekeeping. Stays in the basement, needs no attention, never disappoints.

How to get one: We will place a heater in your home free. Use it two months. If not satisfied, we will remove it if you so request. Or, if desired, you may keep it, and pay for it in three monthly instalments.

We make this offer because we have unlimited confidence in the heater, and want to have it used generally throughout the city.

Come and see the apparatus, or ask us to send a representative.

The United Gas Improvement Company,

* * *

The advertisement was pictorial and well displayed, and was followed by an active canvass. Up to May 20 they had fixed 245 heaters, although the warm season, when naturally the demand increases, had not commenced. This goes to show what can be accomplished by energy and vigour.

The Hire System.

It will be noticed that this was a sale, not a hiring system. In Tottenham, our record has not been bad; but beside the effect of this great effort, the results appear poor. Four years ago we started hiring water-heating apparatus, and at the end of September we had out—

Geysers	419
Coppers	293
Circulators	397
Bath-heaters	100—1209

What the results in the next four years will be, I do not know; but I venture to predict that they will be perfectly astounding. The great secret of securing business in this line is clear and open; let out good apparatus on hire? Why not? Gas undertakings are in an unique position to do it. They have the security of a monopoly of supply of the necessary gas. They have a customer in every house in every street. Therefore they are in a vastly superior position to the coal merchant. His customers are sporadically dotted here and there about the town. Even if he had apparatus equal to ours—which he has not—he could not afford to let it on hire, because his brother coal merchant could sail in as a rival, and annex his profit on the coal. However willing he might be to help the public, he could not do it. The public like the hiring system for apparatus of this class, and will willingly pay remunerative rent for it when they have good security as regards the price of the fuel. This they have with gas; but they could not put their trust in the coal merchant, to give him the monopoly of supply of a fuel which varies in price like coal. It is vastly different with regard to gas. This is a commodity which is steady in price, mostly steadily reducing.

In conclusion, I submit that our consumers, who are, I believe, typical of the British public generally, welcome the opportunity of hiring useful apparatus. They pay a rent equal to 20 per cent. of the cost. The apparatus outlasts the period of amortization. By placing at the public disposal a hot-water supply by means of a fuel which is not only dustless and ashless, but also quick, safe, convenient, controllable, and cheap, a great opportunity of increasing the usefulness of the public service we are already rendering lies at our door. By pushing the system we shall help to make our skies clearer, as well as the lives of the community we serve brighter and more comfortable; and, in addition, we shall increase our sales of gas, and thus enable us to render our public service at an ever-decreasing cost.

Discussion.

The President: Gentlemen,—We have listened to an exceedingly interesting paper. Mr. Broadberry has made it very practical; and we are greatly indebted to him for calling our attention to a branch of service that is probably less attended to than any other. We therefore expect the industry will derive great advantage from the paper that has been read. I am going to ask Mr. Sandeman to propose a vote of thanks to Mr. Broadberry, which will be seconded by Mr. Valon.

Mr. W. J. Sandeman (Croydon): Mr. President, ladies, and gentlemen,—I have great pleasure in proposing a vote of thanks to Mr. Broadberry for the admirable paper we have just heard on water heating. I was glad to find a paper on this important matter was going to be brought before the conference. I quite agree with Mr. Broadberry that there is an enormous field for water heating by means of gas. In Croydon, we have been, for twelve months or more now, supplying geysers and circulators on hire; and the number of inquiries we get for these appliances is surprising. With regard to circulators, we have at the present time nearly 200 in use in Croydon which have been sent out within the last fifteen months; and we are inundated now with inquiries. As Mr. Broadberry mentions, the great secret of securing business in this line is to let out good apparatus on hire. May I add one thing to this—that when you set up your apparatus, you should take care to maintain it. Without this, it is better left alone altogether. We in Croydon have found it necessary to start a special hot-water department. We have had a man specially trained to do this work; and he takes all the inquiries in hand. Especially in connection with fixing circulators, it is important to see that the installation is one to which a circulator could be attached, or one which lends itself to adaptation for it. On this I should like to say something to the manufacturers. We are very frequently approached by the makers of circulators, and are told by them that all you have to do to fix the circulator is to insert a T in the return-pipe, and there you have it. If this is what is going to be done, it had better be left alone. I remember in our own district some years ago, when we knew very little about water heating, a circulator, passing 30 feet an hour, was fixed in the basement of a large house. There was a hot-water tank under the roof; and it required 24 hours' use to produce hot water. It is a matter which should be carried out in a thorough manner, because there is a very fine field for the work. I have much pleasure in proposing a hearty vote of thanks to Mr. Broadberry for his paper.

Mr. W. M. Valon (Stafford): Mr. President and gentlemen,—I have very great pleasure in seconding a vote of thanks to Mr. Broadberry for his excellent paper. After the remarks of the last speaker, there is not much left for me to say; but there is one item in the paper which personally struck me rather forcibly. This is with reference to the B.Th.U.'s being taken on the gross and not the net. Some months ago, I thought I had invented a circulator which came out at 99·9 per cent. I thought I was doing well, and would make a fortune; but I found I was working

at the wrong end. On this subject, I might say there is one class of man whom we can interest very greatly in the question of heating water by gas, and that is the medical man. We have about twenty medical men in our district; and we started on the Medical Officer of Health. I have heard criticisms with reference to the Association's leaflet on this matter. I might say that our Medical Officer of Health became a very satisfied user of gas, purely from the leaflet issued by the Association; and to-day he burns thousands of cubic feet a quarter heating water in his house with gas, and is quite satisfied. It is very difficult to criticize such a paper as this. It is one that we can take home with us, read over half-a-dozen times, and apply to ourselves. I feel confident that if we do this we shall be helping on the consumption of gas in our districts. With these few remarks, I have very much pleasure in seconding the motion for a vote of thanks.

The resolution was put, and carried unanimously.

Mr. H. Townsend (Wakefield): Mr. President,—I agree with the two gentlemen who have just spoken in their appreciation of this very valuable paper. When these circulators were first introduced some years ago, I was so captivated with the subject that I thought I would start it at once. We intended to give the thing a good start. We did all the plumbing work, and fixed all the gas-pipes. The rental was put at a very low figure—viz, 1s. 6d. a quarter. They were fixed in half-a-dozen houses; but in the case of every one, unfortunately, there was a down-draught. This was the great factor which we had to contend with. The early circulators were not to be compared with the more modern ones. They were very fragile; and the result of a year's practice with these six was not an altogether unqualified success. When the circulators were first introduced, they were not provided with a thermostatic valve; but I have come to the conclusion that the thermostat is absolutely essential for the success of the circulator. I think in the South of England, in the residential towns, there is a very big market for the introduction of these circulators, either for sale or on hire; but in such districts as ours, there is a very restricted demand for them. We have a few out, but not many. In our district, the workman's wash-boiler is a thing which is in very great demand. We supply wash-boilers, fix them free, and charge the very moderate rental of 1s. per quarter. Every cottage house that is now being built in our district is being provided by the landlord with one of these wash-boilers. I should think we must have more than 1000 of them in use by this time. We are also experiencing a demand for an apparatus which is not at present on the market—the wash boiler which will not only wash the workman's clothes, but will also supply him with hot water for a bath, without the necessity of baling the water out of the boiler, and also without the necessity for having a drawing-off tap. A draw-off tap is an objectionable thing in a working-class home, because there is the risk of the children turning it on accidentally and scalding themselves. There seems to be a movement in our part of the country for the provision of baths for working-class people; and if the makers can only see their way to produce a wash-boiler which can be used for washing clothes, and also used for bathing purposes, they will be performing a great service.

The President: Do you mean to put a tap on the bottom of the boiler?

Mr. Townsend: No.

The President: You want a pipe to convey the water to the bath?

Mr. Townsend: Yes, that is so. The baths that are being fitted in our district are provided with a cover, so that when they are not being used, they can be employed as a table for ironing purposes. In conclusion, I wish to join with the previous speakers in thanking Mr. Broadberry for his interesting paper.

Mr. Thomas Potterton (Balham): The subject of Mr. Broadberry's paper is an important one to the gas industry, being one of the most recent developments of note that have occurred in the uses of gas; and having regard to the extensive operations already performed by the principal gas companies, new scope for increased sales is shown to all interested in the distribution of it. In this connection, I am, of course, referring to boilers (or circulators), not so much to the instantaneous heaters, which came into general use some time prior to the advent of the gas-boiler. Mr. Broadberry emphasizes many strong talking points in favour of "Gas *versus* Coal," which are worthy of note to all sellers of gas and the appliances connected therewith; and to augment the information given, some particulars as to the operation of different systems may be of interest to the meeting. An outstanding feature of the advantage the gas-heated system possesses is the quick effect obtainable in producing hot water; and as this is commonly a point upon which inquiry is made by prospective consumers, the information should be at hand. The following quotation from a test of the No. 20 "Victor" boiler with cylinder apparatus, as installed for ordinary domestic purposes, will, I believe, afford an example:

Temperature of Cold Water, 64° *Fahr.*

Gas lighted—	6.10 p.m.		Flow-pipe temperature—			64°
"	6.15 "		"	"	"	94°
"	6.20 "		"	"	"	130°
"	6.25 "		"	"	"	145°
"	6.30 "		"	"	"	152°

At 6.30 p.m., 25 cubic feet of gas were consumed; and in testing the supply, the hottest water drawn registered 153°, 5 gallons in bulk 130°, 10 gallons 132°, 15 gallons 119°, 20 gallons 110°; 9½ cubic feet of gas being consumed during the process of running the water.

The foregoing is incomplete as a test for efficiency, being *minus* the contents of the boiler; but it shows how soon hot water can be obtained, which for early morning purposes is much appreciated. Such results are, of course, unattainable from a range-fire; while, in heating water for the bath, equal advantage occurs in favour of gas, which therefore scores both ways. Such effect is, of course, only produced by the correct method of pipe connection; the flow-pipe from the gas-heater being carried to the expansion pipe, in order that the circulating water shall be stored at the top of the cylinder without mixing with the bulk. Dealing with the tank-system (where the storage is upstairs), the full advantage would not be obtained to the same extent, as the supply is branched from the flow-pipe, and therefore seldom (if ever) delivers the whole of the hot water, though even with this system the quick effect is still pleasing. Such is the information we put in front of consumers; and by emphasizing the numerous advantages in regard to hiring, together with the cleanly and labour-saving qualities possessed by properly-applied gas apparatus, the competition of coal is generally overcome.

Alderman Nicholls (Stretford): Mr. President,—I realize that in our district this question of water heating is immensely important. There is an enormous field for the use of gas, if this question is solved. The reader of the paper seemed to assume that it was absolutely solved; and I should be glad if it were. I should like him to put before me some data from which I could feel this was the case. In regard to facilities for applying the gas water-heater, I have no difficulty at all; but the one thing to aim at is cheapness. In our district, coal is cheap, and almost everybody can get a good supply of hot water from the boiler at the back of his grate. Anyone would admit that water heated by gas is as cheap as it can be by a coal-fire; and the thing to aim at is to convince consumers of the fact.

Mr. Douglas Helps (Reading): A little learning is a dangerous thing; and I think this applies with greater truth to the question of hot-water heating with circulators than anything else. The question of price has been mentioned. I do think that, rather than get the price of one's gas down to the lowest possible figure, it would be much more important to spend the money in educating the consumer, and more particularly in educating the workman who is engaged on the work of fixing the hot-water apparatus. This is a subject that is not thoroughly understood. Some time ago, I was in communication with Mr. Yates (John Wright and Company), who had an apparatus which could be placed in a glass case and fixed up in the show-room, to show the circulation of the water. This could not be done unless you had some material which would circulate with the water. Mr. Yates has not been able to do this; and I should like to ask Mr. Potterton if he has.

Mr. Potterton: We have the whole system in use in our works; and we simply employ sawdust.

Mr. HELPS: Can you keep it continuously circulating in a show-room all the week through?

Mr. POTTERTON: If your apparatus is working, there is no difficulty. You can do it with sawdust. I might tell you that it is very fragile.

Mr. HELPS: I know amber may be used. I should like to emphasize the point about price. It would be much better to spend a penny in subscribing to the funds of the Commercial Gas Association than lower the price of gas by a penny. The penny will make no difference in the world to the consumer. No consumer would leave you for the sake of a penny. There is one other point I should like to make. When any of the companies go to Parliament, I do hope they will, if they can, get a gross calorific standard, and not a net one.

Mr. F. W. GOODENOUGH: Mr. President and gentlemen,—I will not take up your time for more than two minutes, as you have had enough of me already this morning; but I want to say three things. One is that the increased use of gas for water heating will increase the use of gas for cooking purposes. This is a point which wants to be borne clearly in mind. If a householder has a means of getting hot water readily from gas heating, he will use gas more frequently for other purposes. The next point I want to make is that the hot-water problem is a different problem for different houses, and generalization is not of much value. You want to apply expert knowledge to the treatment of each problem; and for this purpose the articles that are appearing in the "Bulletin" on the subject are worthy of the study of all engineers concerned in the hot-water question.

Mr. BROADBERRY: Mr. President, Mrs. Brereton, and gentlemen,—I am very pleased that this paper has brought forth the discussion it has. I believe, if we had time, many of you could have given useful information which would have greatly benefited the industry regarding this new branch; but unfortunately the time before us is limited. I do not know there is a great deal to which it is necessary for me to reply in the discussion that has taken place. Mr. Sandeman referred to the need of maintenance and rendering efficient service by your staff. This, I think, has already been brought before us this morning by Mr. Waddom; and I need not deal further with it. Mr. Townsend referred to the thermostatic valve as being the most important and essential point in the circulating system; and so far as this goes, I quite agree with him. Without the thermostatic valve, there might be a great deal of waste going on; but the valve prevents it, and this is what makes a success of the gas-heated circulator. Alderman Nicholls says I merely assume that the problem has been solved; but I would ask him to bear in mind that in a paper of this description it would not be suitable for me to introduce a description of any one particular maker's apparatus, and deal with that, when there are so many excellent appliances on the market at the present time, that people can make their own choice. It is altogether against the rules of the Association to describe and press one particular make of apparatus. Then reference is made to the necessity of having coal-fires during the summer. One great object we have in view is to get rid of all summer fires by providing a means of heating water as it is required in the summer time, and doing the cooking in the summer time with gas-cookers. The two things have to go hand in hand; and if in Stretford they will devote themselves to this dual system of heating water and cooking food by gas, I think it will be found that the summer fires will disappear, even with the low price of coal they experience. One other thing I would like to mention before I finish is that my reason for saying the important point in getting hot-water apparatus adopted and let out at remunerative rates is that our experience shows us our consumers are very fond of hiring anything. It is not always that they have not money to pay for it; but if they have bought it they have to put up with it for ever. Whereas, if they hire it, they have the comfortable feeling that at any time they like they can turn it back on the gas company, and if the following week some great improvement is brought out, they know they have not landed themselves for ever with an obsolete machine which is superseded the very moment they have bought it. As I say, for this reason they prefer to hire it. Therefore, I believe the great secret of making this hot-water heating become popular lies in letting apparatus out on terms which are satisfactory to the gas consumer as well as remunerative to ourselves.

THE DEVELOPMENT OF THE USE OF GAS FOR INDUSTRIAL PURPOSES.

By H. M. THORNTON, J.P., of London.

The papers which have been read in recent years on industrial appliances for use with gas have dealt principally with the technical and constructional side. My endeavour will be to direct your attention to the further business which I believe is waiting for a strong lead commercially, and which will bring results in increased gas consumption—surprising even to those who believe, as I do, in the great possibilities for the further development of industrial gas. There is abundant evidence that rich rewards will be obtained by undertakings giving special attention to this subject; and, as one of our American friends puts it, we shall find that "industrial gas is the wholesale side of our business."

The advent of the incandescent gaslight gave the industry not only a new light, but new life, and almost simultaneously came the real and serious effort to capture the trade in fuel for domestic cooking, which to-day is an accomplished fact. Again, in very recent years, the gas-fire has, by its wonderful advance in efficiency, economy, and artistic design, created a very big demand, and consequent increased business to gas undertakings. Water heating is also playing its part in the domestic sphere, and is destined to grow enormously.

CULTIVATING THE INDUSTRIAL FIELD.

Dr. Colman, at the recent meeting of the British Association in Birmingham, advanced the opinion that "it seemed probable that the quantity of gas taken for industrial purposes would eventually equal, and perhaps exceed, that consumed for all other requirements;" while some years ago Sir William Siemens made the statement that "the time would come when the use of crude fuel would be simply barbarous, and that nothing except gas would be employed." Since the latter prediction, there have been great strides along these lines; but, except in a few centres, the possibilities for gas as a fuel in the great and growing industries of the country have not had from us the attention and serious thought that they deserve. At the same time, I find, as a result of inquiries throughout the country, that the manufacturers themselves regard gas as essential for many processes in their business, and are using it to-day. In many cases, however, this is being done in a very crude manner; and it is in the direction of improved and more efficient apparatus for the work to which gas is now being applied, as well as in the utilization of gas for manufacturing purposes for which it is not now used, that the prospects of increased business are so apparent. The "JOURNAL OF GAS LIGHTING," in a recent issue, said: "Greater attention is being paid to the potentialities of industrial gas than was at one time the case; but there is still missing in many places a systematic dealing with this branch of the business."

The somewhat slow progress made in the sale of industrial appliances and, as the "JOURNAL OF GAS LIGHTING" puts it, the absence of "systematic dealing with this branch of the business," are perhaps due to the fact that the industry has only during the last few years really specialized on the selling side, and the organization which is essential to such a far-reaching change has been chiefly directed to the definite propaganda of increasing the domestic consumption per consumer to its maximum. Another reason—and, I think, the principal one—has been the want of detailed information; but this, happily, is now being supplied by our Association in its periodical "A Thousand and One Uses for Gas," which must be of the utmost value to those who carefully peruse and distribute it to manufacturers. A further reason, and one which would apply more particularly to smaller undertakings and to the gas companies supplying residential areas, is that they feel the possibilities in such districts are very limited. This latter view, however,

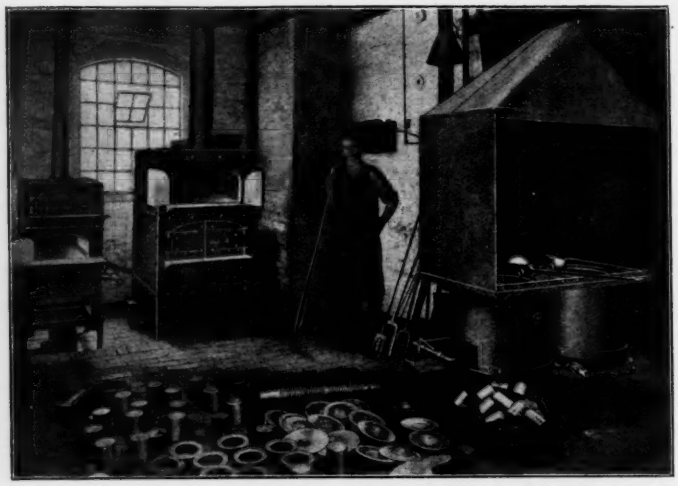


Fig. 1.—Twin Oven Furnaces for Annealing Metal Stampings (Soft Metal Melting Furnaces also seen on Right-Hand Side).

is, if it is in our minds, worth reconsidering; for some of the illustrations in this paper are reproduced from photographs taken in the districts of gas companies which are essentially residential, and show that, even in such centres, there are many opportunities for industrial gas development. But whatever the cause for the comparatively slow progress up to now, I am sure that the matter is one which we shall all agree is worth the fullest consideration, and, where necessary, that definite steps should be taken so as to place it on on equal footing with the progressive methods adopted in other directions. It is with this object in view that my paper is presented to you to-day. To detail the numerous industrial operations for which gas is, and will be, used, or to give anything but very general particulars, would be an impossible task for the purpose of this paper; but a brief review of the uses of gas in some of our leading trades, accompanied by the illustrations, will, I hope, be of interest and valuable for future reference.* In the larger manufacturing centres, most of the applications to which I shall refer have unlimited scope; but smaller undertakings will, I trust, also find the information of service.

Annealing.

Perhaps one of the most generally known processes for which gas is particularly useful is that of annealing. This operation, as will be well known to most of you, is to soften metal by heat, which also renders it more ductile for shaping under a press and for machining. For the annealing of stampings made from sheet metal, gas is being increasingly used; and where the metal stampings are subjected to one or two heats only, a single oven furance serves the purpose.

Some of the stampings have to be subjected to the pressing or drawing machine four or five times or even more; and they require annealing between each operation. This is often the case with special forms of stamped or drawn nickel silver, brass, &c. For this purpose a twin-oven furnace is preferable; the top oven being used for preheating the articles gently before subjecting them to the full annealing temperature in the lower oven, thereby avoiding heat cracking, which may take place when the single oven type is used. Fig. 1 clearly shows the working of the apparatus.

Wire manufacturers in some cases use gas-furnaces for annealing the finer grades of wire; and at Cleckheaton (Yorkshire) the consumption of gas for this purpose is about 45,000,000 cubic feet a year. The heavier grades of wire are usually annealed by hard fuel—though it is quite possible in the near future we shall be able to capture more business for gas in this direction. But even at the present time, as will be seen from fig. 2, gas jets are used at the entrance to the heated chamber so as to prevent the admission of air, and consequent scaling of the wire.

Gas-furnaces can also be employed for annealing steel tubes (see fig. 3, which shows the annealing of steel electric conduit tubes), also for softening the ends of steel studs used in the motor and cycle chain-making industry. Yet another annealing process is a rotating furnace for the metal backs of buttons for ladies' costumes, &c. In some cases the front of the button is covered with cloth, and in others the fronts are japanned. This latter process is also done, or can be done, by gas. Steel pens, gun barrels and breeches, motor cylinders prior to repairing by the oxy-acetylene process, and many other articles can also be annealed by gas.

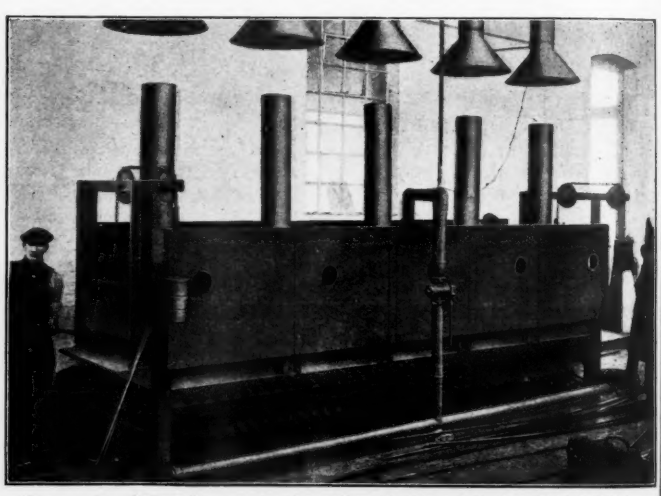


Fig. 3.—An 18 Feet Furnace for Annealing Steel Conduits for Electric Wiring.

Manufactured steel, in bars, is sent out by the makers in an annealed condition; and for this purpose gas-furnaces are being increasingly used. Fig. 4 illustrates two steel bar annealing furnaces. These are approximately 16 feet long, from which fact it will be obvious they consume gas on a large scale. Annealing in coal-furnaces necessitates packing the bars in a heavy cast-iron box to prevent scaling of the steel. This box is considered by some to be unnecessary in the gas-furnace, in view of the uniform conditions under which gas-furnaces work. The elimination of the box naturally means less absorption of heat. Decreased labour is also an important factor—in short, gas annealing has proved to be very economical. In many of the smaller steel works where annealing is intermittent, the saving achieved by the use of gas-furnaces is something like 50 per cent. in the cost of fuel alone.

Following, then, the progress of the steel bar to the manufacturer of hand and machine tools, gear parts, mining and agricultural implements, cutlery, ordnance materials, electrical appliances, and the manifold component parts of machinery, we come to the processes of hardening, case-hardening, and tempering.

Hardening.

This process, as you will be aware, is the one whereby steel is converted into its hardest state by being subjected to heat and quickly quenched-off to a cold temperature, either by means of liquid or by air blast.

Case-Hardening.

This is the method of converting mild steel, which will not harden direct, into a steel which will harden glass-hard on the

* The author included no less than one hundred illustrations in his paper; but a selection from the list is only possible for our pages.—Ed. J.G.L.

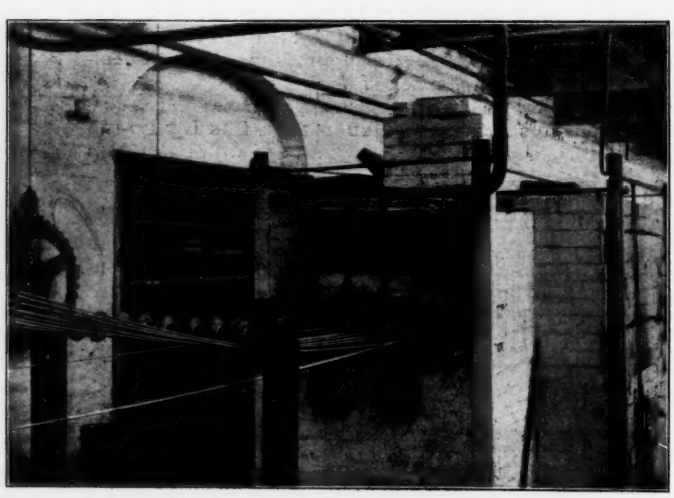


Fig. 2.—Wire Annealing Furnace with Gas-Burners at Inlet of Heated Chambers.

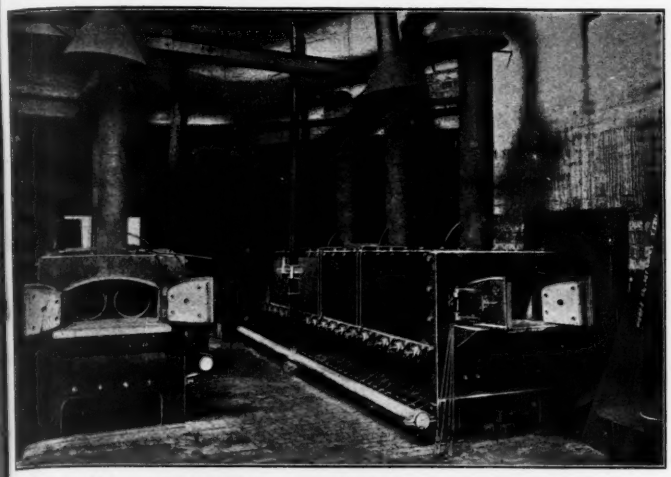


Fig. 4.—Two 16 Feet Steel Bar Annealing Furnaces of Regenerative Type.

surface when quenched-off in water, leaving a soft core in the centre of the bar—making practically an almost unbreakable steel. This steel is very suitable for gear wheels, cam shafts, bicycle and motor parts, &c. After this carbonizing process is complete, the steel article is subjected to a hardening process, which varies according to the different methods in vogue and is generally known as the "thermo-treatment" of steel.

For all these operations gas-oven furnaces are being increasingly used. Fig. 5 illustrates part of the hardening shop of a large tool and motor company.

Tempering.

This is the process of heating-up hand and machine tools, gearings, &c., to a certain temperature which is known to give the temper to the steel. This operation is carried out by two different methods—*i.e.*, tempering by colour or by temperature. Such articles as razors, shear blades, saws, and articles of a kindred nature are frequently tempered by colour on an open or covered heating plate. Tempering by colour of smaller articles is more generally carried out in rotary furnaces, as shown in fig. 6, which portrays the tempering of motor and cycle chain links.

Tempering by temperature without colour is done in furnaces containing oil, fat, lead, or salt mixtures.

The various and complex methods of the thermo treatment of steel to which I have referred in brief summary, and which differ according to the qualities of steel and methods adopted, are naturally somewhat outside the scope of this paper. My intention in briefly mentioning them is to illustrate the wide field of usefulness for town gas in all hardening shops—in fact, wherever manufactured steel is used.

Before passing from this subject, our attention is naturally directed to the possibilities that the motor car, motor cycle, and cycle industries present for the application of gas. The motor industry particularly, both for pleasure and industrial vehicles, is growing rapidly, and in every town repairing depôts on a large scale will become more general than now, and will provide great opportunities for industrial gas for hardening, case-hardening, and tempering purposes.

In a recent paragraph in the "Gas World," reference was made to one of the largest, if not the largest, motor-works in America which monopolizes the entire gas production of a new gas-works in Detroit; and I understand from a friend just returned from the United States that this Company use upwards of 2,000,000 cubic feet of gas per day. Also we must not overlook the air-craft industry, which will undoubtedly open up many possibilities for gas.

Forging.

The forging of cutlery, file tangs, edge tools, &c., and drop forgings, can be, and are, successfully operated by gas-furnaces. These furnaces are fitted with gas and air blast or high-pressure gas, and for the work above described are, in most cases more economical and efficient than the hard-fuel furnaces.

Metal Melting.

The applications of gas for metal melting are particularly varied. It is used by gold refiners, jewellery manufacturers, goldsmiths, and silversmiths—in fact, wherever precious metal is melted from its solid state for any manufactured process, gas is found to be the most satisfactory fuel.

The melting of brass, aluminium, admiralty, and other alloy metals also presents an important opening for the application of gas-heated crucible furnaces. Fig. 7 gives some idea of this work in operation. Lead and stereo-metal melting is found in many industries. One of the chief and most familiar trades, to which gas for lead melting can be applied, is the printing trade. In every town—Metropolitan or Provincial—the printing trade is represented in some form or other. The type founder who supplies the type for the printer requires a lead-melting furnace for type-founding, the stereotyper for stereotyping, and the general melting

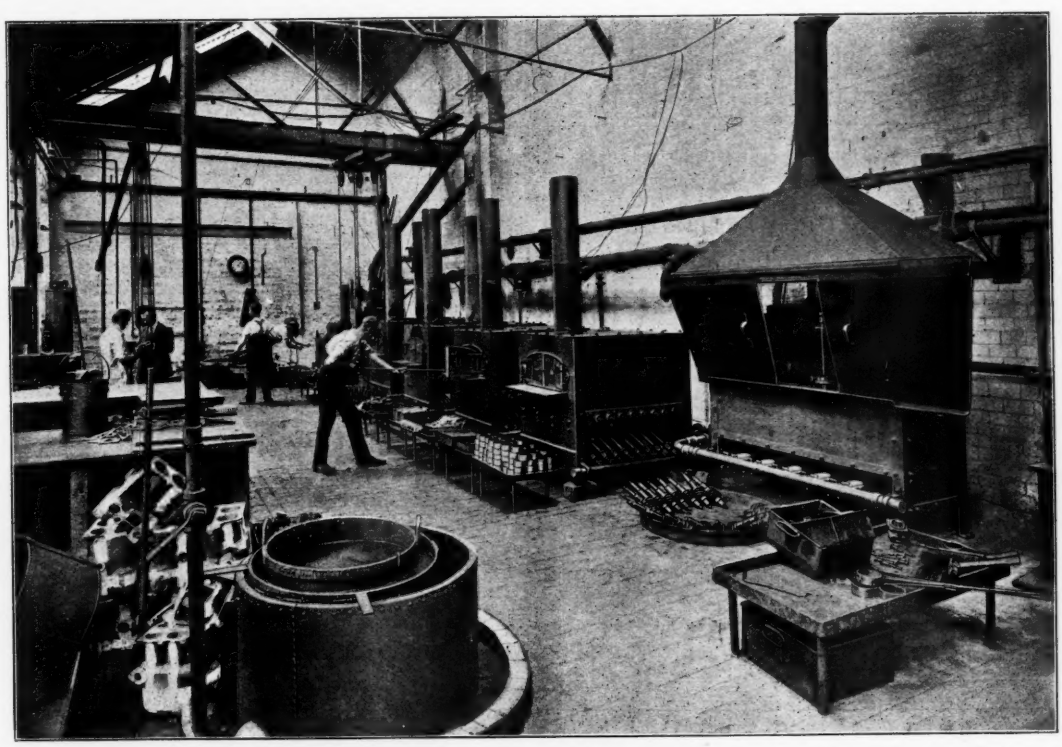


Fig. 5.—Part of the Hardening Shop in a Large Motor Car Works, Illustrating Several Types of Furnaces.

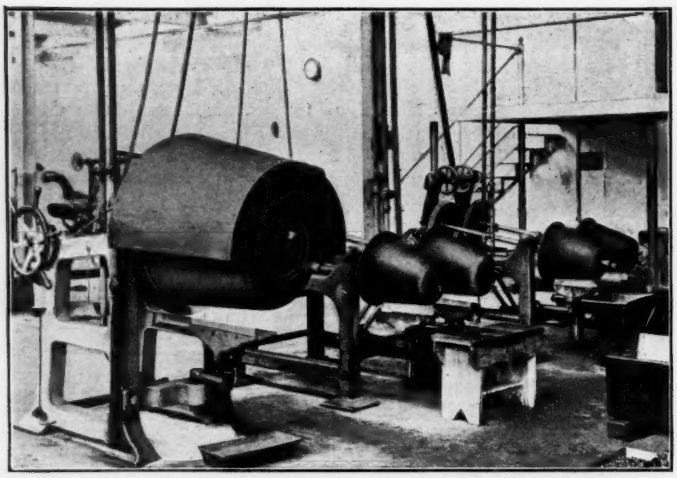


Fig. 6.—Rotary Furnace for Tempering Motor and Cycle Chain Component Parts.

of metal for composing machines which is a daily process in large printing offices. One could continue enumerating the applications of gas for melting metals; but enough has already been said to show the extensive possibilities for this purpose.

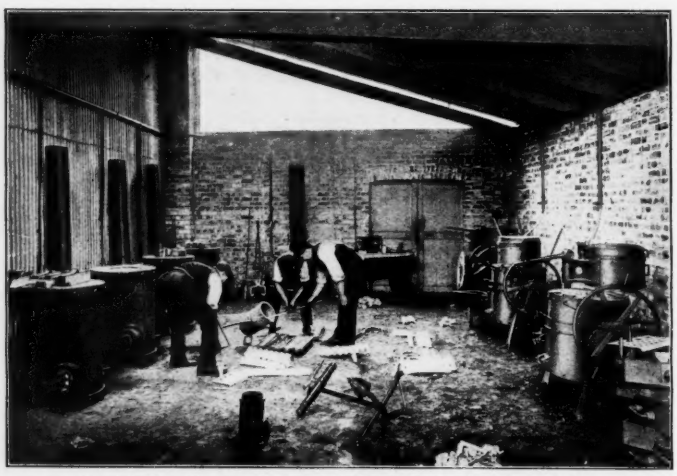


Fig. 7.—Suite of Melting Furnaces (Three of Tilting Type) in Use for Casting Aluminium.

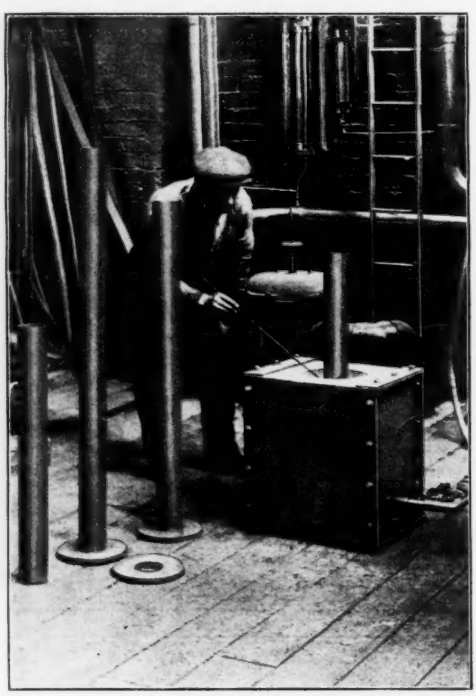


Fig. 8.—Heavy Flange being Brazed on to Copper Tube in Gas and Air-Blast Cyclone Furnace.

Fig. 9.—A Broken Cast-Iron Cog-Wheel repaired by Special Brazing with Gas.

Brazing, Blow-Pipe, and Soldering Work.

For brazing, blow-pipes with gas and air blast or high-pressure gas are extensively used; and there are many undiscovered opportunities for gas in this respect. As an instance of this, leading marine engine works and copper tube works have been brazing heavy flanges on copper pipes with hard-fuel brazing furnaces; but only recently some of them have been persuaded to use gas for this purpose. In this case, the advantage as compared with the hard fuel system is that the metal and flux are kept clean and free from particles of dust, and a more reliable joint is therefore made. Fig. 8 will give some idea of the apparatus used.

Recently a new brazing method came to my notice, which may eventually open-up a further use for gas. An engineer associated with the Indian Railways has introduced a new brazing material in connection with which he advocates town gas. Heavy castings, such as large cog wheels and embossing presses, which have been fractured, have been

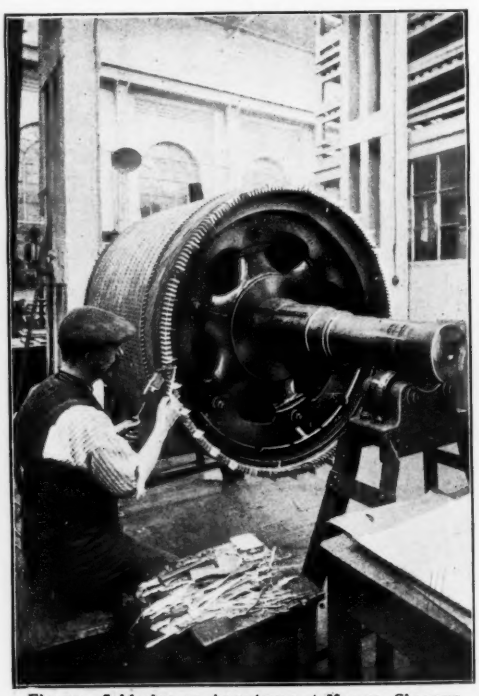


Fig. 10.—Soldering on Armatures at Messrs. Siemens Brothers' Works, at Stafford.

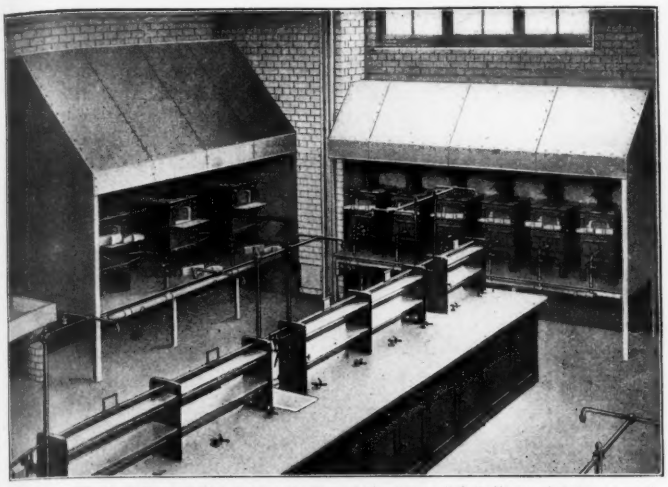


Fig. 11.—Part of One of the Laboratories of the Imperial College of Science and Technology, South Kensington, Showing a Suite of Assaying Muffles.

successfully repaired with his brazing material by the use of gas blow-pipes. Fig. 9, illustrating a repair, will give a good example of what has been done. It will be noticed that the wheel has been broken in four places, and it is stated that the casting ran perfectly true upon the shaft bearings after the repair. Blow-pipe work has many applications other than brazing.

Incidentally, I may observe that from the generation of electricity to its use our electrical friends have recourse to the thermal properties of their competitor's commodity. In fig. 10 we have a well-known electrical firm consuming gas freely for industrial purposes. The operator, as you will recognize, is using gas-fed soldering irons in the manufacture of armatures.

Assaying.

In all metallurgical laboratories, public and private, chemical laboratories, research departments of public companies, and also by analytical chemists, we find useful work for gas. Fig. 11 shows one of the laboratories of the Imperial College of Science and Technology, South Kensington, fitted up with fifteen muffle furnaces, which are used for the assaying of metals by the mining engineering students.

In passing, I would emphasize the importance of cultivating friendly relations with the professors and lecturers of local technical institutes and colleges. Not only are they good present or prospective consumers (for gas is used for one purpose or another in all research laboratories and workshops), but they have, under their tuition, students who will eventually occupy responsible positions in the industrial world; and the impressions they receive during their training will, to a large extent, influence their future work. It is difficult to over-estimate the potential value to the gas industry of a student who during his years of tuition has become accustomed to handling well-designed and efficient gas apparatus.

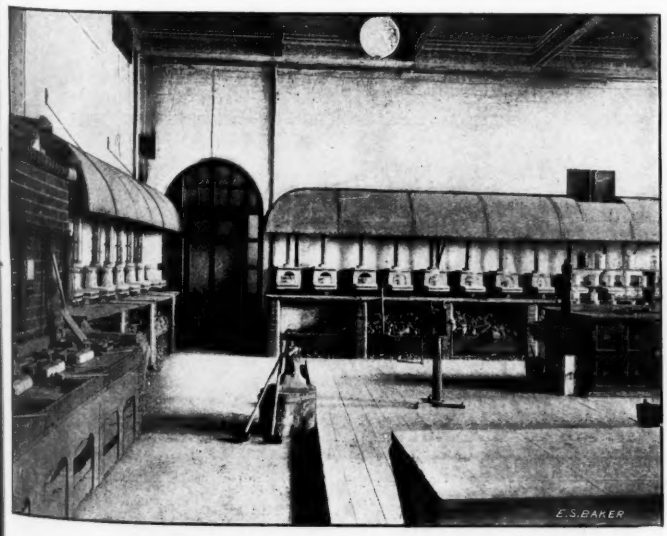


Fig. 12.—Metallurgical Laboratory of the Birmingham Municipal Technical School, fitted with Gas Muffle Furnaces.

Fig. 12 shows the metallurgical laboratory of the Birmingham Municipal Technical School, fitted with gas muffle furnaces. As a matter of interest, I would also point out the coke-furnaces, which are also installed for the use of students.

Enamelling.

In the art of enamelling on metal, china, and pottery, and gilding on glassware, gas is being used most successfully; and there are possibilities here which are worth looking into where such trades exist. The famous Ruskin Pottery, for some of its finer productions, is fired in gas-heated furnaces. The same kind of muffle can be used for all kinds of enamelling on metal. We have in the exhibition arcade an example of this work being done, and it will be of more than passing interest to see how gas is employed in so delicate an operation.

Steam.

The raising of steam on a small scale is open to more definite propaganda work. For raising steam for heating

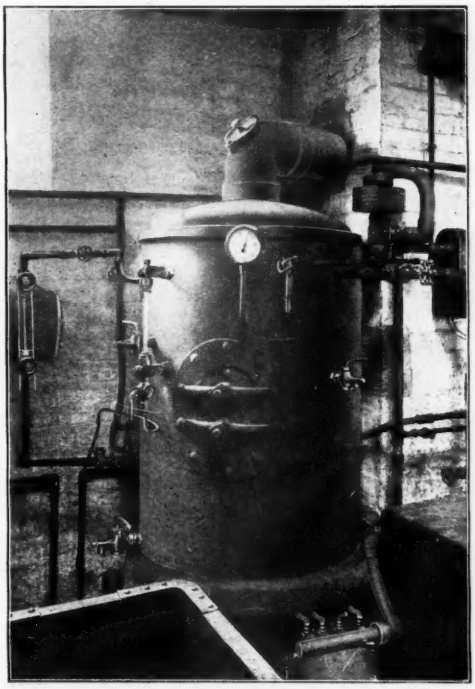


Fig. 13.—Type of Gas-Heated Steam Generating Boiler.

printers' presses, small jacketed boilers, moulds, large cooking apparatus, drying and enamelling ovens, bending and shaping of cardboard, wood bending, vulcanization of rubber, and many other uses where steam is preferable to any kind of heat, gas should be largely used. Fig. 13 shows a type of steam-boiler. This particular one is in use for heating the contents of steeping tanks used for colouring sycamore veneer—giving it a pearl blue tint. This veneer is largely used in first-class panelling-work, such as ocean liners.

Our American gas friends have made a special feature of steam-boilers for industrial work, and the illustrations appearing in the reports of papers delivered in 1911 before the National Commercial Gas Association are available, and will be interesting. They apply gas generated steam to many trades there which we have here; and I am quite sure this subject offers scope for inquiry and development. Professor Bone has, in the larger work of steam raising for factory boilers, opened up possibilities which should mean an enormous field for the gas industry.

Japanning.

Although steam-heated ovens are much in use for this work, gas is very popular and holds its own. As a few examples of the very extended use of japanning ovens, I might mention the cycle, bedstead, gas-stove, fire-grate, electrical, tinware, brass hollow-ware trades, as well as many others.

Glassware Industries.

Quite recently there has been a distinctly forward movement in the adoption of gas for the different heating operations in the manufacture of glassware. During the operation of glass-blowing, the glass under process of formation requires re-heating to maintain it in a plastic condition. For this purpose gas-furnaces, called by the trade "glory holes," are now being used. These furnaces are also used to obtain a good surface on moulded glass. As soon as the glass-blower has finished his work on the article, it is immediately transferred, while hot, to a low-temperature furnace to allow gradual cooling. In some of the modern glass-works, the furnace for cooling down is of the Lehr type. These furnaces are usually from 40 to 70 feet long, and about one-fourth of the length is heated by town gas to a scarcely visible red temperature. The hot gases from this portion of the furnace travel through the remaining length—thus giving a graduated heat. The articles are placed in the warm end of the furnace and travel down very slowly towards the cool end, carried on rectangular iron trays, which are attached one to another. These trays are pulled along by a hand winch with ratchet two feet every 30 to 60 minutes according to the class of work. A furnace of this description may consume up to 2,500,000 cubic feet in 300 working days.

In the stained glass trade, gas kilns for firing glass are used. The colours are painted on the glass, the glass placed on the trolleys, and wheeled into the kilns; the firing taking from 30 to 60 minutes.

Baking and Confectionery.

The baking of bread and confectionery is a staple trade throughout the country; but in this direction gas is not being used as extensively as it might be, and for large work particularly it will well repay investigation. The experience of our friends across the Channel—the Paris Gas Company—is interesting. They have furnished me with some particulars of their work in converting to gas firing old-fashioned brick-built ovens. To quote from the letter of their Manager: "In 1911 there was not a bakery in Paris heated by gas. Now there are forty bakeries with ovens heated by gas; and we are certain of a continuous development."

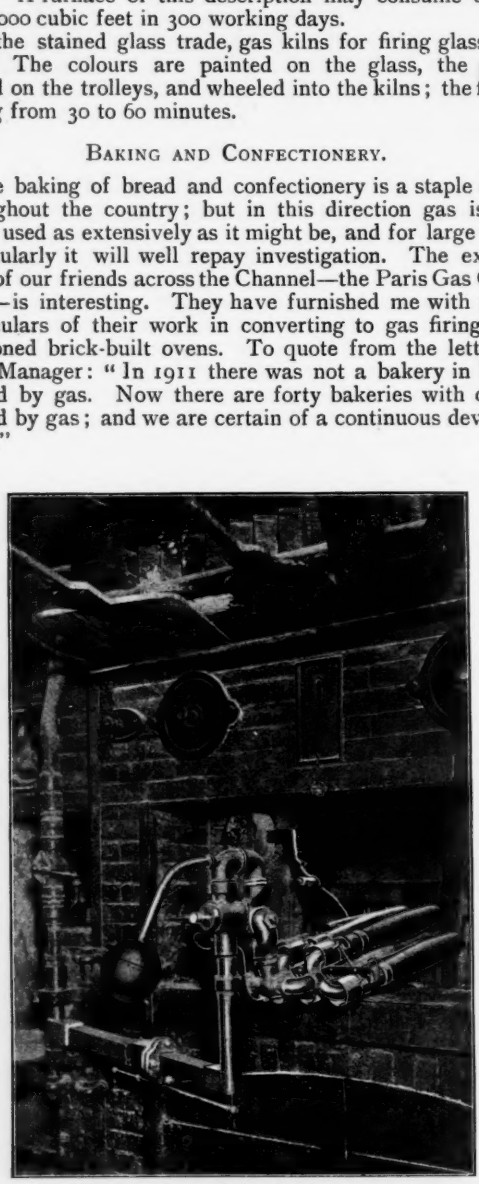


Fig. 14.—Parisian Type of Bread Baking Oven converted to Gas Firing.

Figs. 14 and 15 show the method of conversion. The oven, starting from cold, is heated up to the baking temperature in about 25 minutes, and subsequent heatings (following directly on) only take about 10 minutes. The apparatus used is a cluster of high-power bunsen burners, set in a horizontal position (as shown in the illustrations) and conveniently fixed to a swivel bracket. These burners are swung into the mouth of the oven into which the long bunsen flames penetrate. When the desired temperature has been reached, the burners are turned off and withdrawn from the oven. I am further given to understand that the gas consumption is no more costly than that of the wood previously used—and this with gas at 20 centimes per cubic

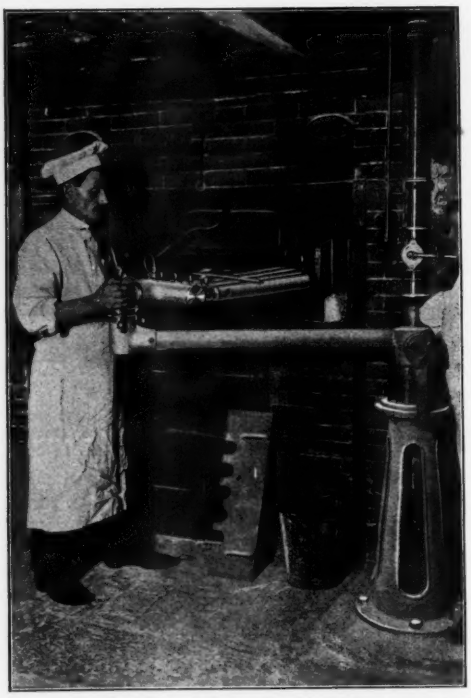


Fig. 15.—Parisian Type of Bread Baking Oven converted to Gas Firing.

metre, which is approximately equivalent to 4s. 7d. per 1000 cubic feet. The saving in labour is also self-apparent. I have to acknowledge with many thanks the interest that M. Simon St. Just, of the Paris Gas Company, has shown in the inquiries I have made, and for the kind manner in which he replied to my several letters, also for the illustrations I am able to show.

Sugar Boiling.

Gas is coming to the front in this direction, and results can be obtained with it that should ensure a much more general use for the numerous smaller sweet factories and trades, which may be found in almost any town.

Hat Trade.

In the making of felt and silk hats, gas can be used from start to finish—shellac for stiffening, presses for shaping, burners for singeing, irons for velouring.

Cotton and Woollen Industries.

Gas is used in these industries on quite an extensive scale for tentering, singeing, calendering, and conditioning; the machines in some cases consuming from 200 to 300 cubic feet of gas per hour each.

Tentering.

Tentering is the stretching of cloth. To enable this work to be carried out more effectively, the cloth is first moistened by being passed through or over a steaming chamber or damping box. It is then clipped at each side, stretched, and passed through the machine at an average speed of 40 yards per minute. In its passage through the machine it passes over gas-flames above which is placed a copper sheet, which, when heated by the gas, drives the steam and moisture out of the cloth.

Cloth Singeing.

This process consists of the burning-off of all the nap and loose threads in order to give the cloth a smarter appearance when finished. The cloth is passed over a row of gas-jets or over a copper plate heated by a gas flame at a speed varying up to about 200 yards per minute according to class

of goods. It is then run through water to extinguish possible sparks.

Thread Singeing.

The thread is automatically wound off a bobbin and passed through a naked gas-flame on to another bobbin at the rate of 200 yards per minute; the single threads or strands being burnt off (singed) in the process.

Calendering.

Calenders are used for finishing cloth and are generally provided with one or more internally heated rollers. The heating is done by either steam or gas; the latter being more effective and a greater heat being obtained. The calendering of the cloth is done at a speed varying from 80 to 100 yards a minute.

Conditioning.

This apparatus is for reducing wool, &c., to a state of dryness, in order to find out the amount of moisture in the wool, as sold in the bales. To effect this, air (above the temperature of boiling water but below the temperature of scorched wool) is blown through the wool placed in the oven. This, in the course of from twenty minutes to half-an-hour, blows the whole of the moisture away. The oven is maintained at the same temperature as the hot air, so that in weighing the whole an equal temperature is maintained after the air has been shut off. The waste heat from the oven is extracted by a suction fan and passed through a preheater, so that there is no loss of heat; the final products being driven away at a very low temperature. The full conditioning of the wool includes determining the amount of oil, length and strength of the fibre, &c.

I could continue detailing many other trade processes; but I hesitate to add further to the length of this paper. I have not mentioned in detail the application of gas for laundries, tailors' workshops, barbers, and such trades, not because they are a negligible quantity in the yearly gas consumption, but because they are more familar and well known. For the same cause, I have omitted any reference to gas engines, factory and workshop lighting, hotel and restaurant and special cooking apparatus. In the supplement, however, a list is given of approximately 400 trades in which it is known gas is now being used, which has been compiled with the assistance of information which has been sent to me from all parts of the country. At the end of the paper will also be found further illustrations of various interesting trades in which gas is used; but time will not permit me to refer to them in detail.

Demonstration Rooms.

My allusion to some of our leading trades and the particulars given will, I trust, have had the effect of interesting and convincing you that the industrial side of the gas industry, although the present position is favourable, is still rich in possibilities. The remainder of my paper will contain a few suggestions for the organization and development of this part of our business. What has been done, and is being done, in centres like London, Birmingham, Sheffield, Sunderland, Glasgow, &c., has already been made known at various times; but mention of these places leads me to my first point—viz., that of Demonstration Rooms. The Sheffield Gas Company, I think, can claim to be one of the first, if not the first, to open a really comprehensive and up-to-date room. Fig. 17 shows their most recent effort in this direction.

This Company have taken steps to develop the use of industrial gas in a manner which is well worth our attention and emulation. Their room is fitted with a large number of gas-furnaces of various types, which are ready for demonstration at any time a manufacturer desires to have a practical test of how gas can be applied to his special trade or for any particular purpose. The room is in charge of a qualified representative, who has been specially trained to deal with this work, and who can give expert advice. To this point I shall revert presently. There are at least 1200 gas-furnaces and other industrial appliances in daily use in Sheffield. This figure is sufficient to show that the annual consumption of gas resulting therefrom is enormous.

Birmingham, the great centre of the metal and motor trades, which perhaps has a greater variety of manufacturers than any other city or town in the country, has also for several years recognized the possibilities of gas for brazing, melting metals, case hardening, &c. With considerable foresight and ability, the gas authorities there have taken up a directing influence, and, as part of their scheme for development work, they have a well-equipped gas-furnace laboratory and experimental foundry, where consumers can have the advantage of sound practical advice and experimental research.

The present estimated annual consumption of industrial gas in Birmingham is 750,000,000 cubic feet, excluding that used for gas-engines. Figures such as these carry conviction as to the great advantage of practical demonstration, for without it in these centres it is very unlikely that such results could have been obtained.

What has been done in Sheffield and Birmingham can be, and in some other places I know is, done with proportionate success. The Glasgow Corporation Gas Department—to whom, parenthetically, I should like to say this Association has expressed its full appreciation for the splendid support given to it from its inception—have also opened

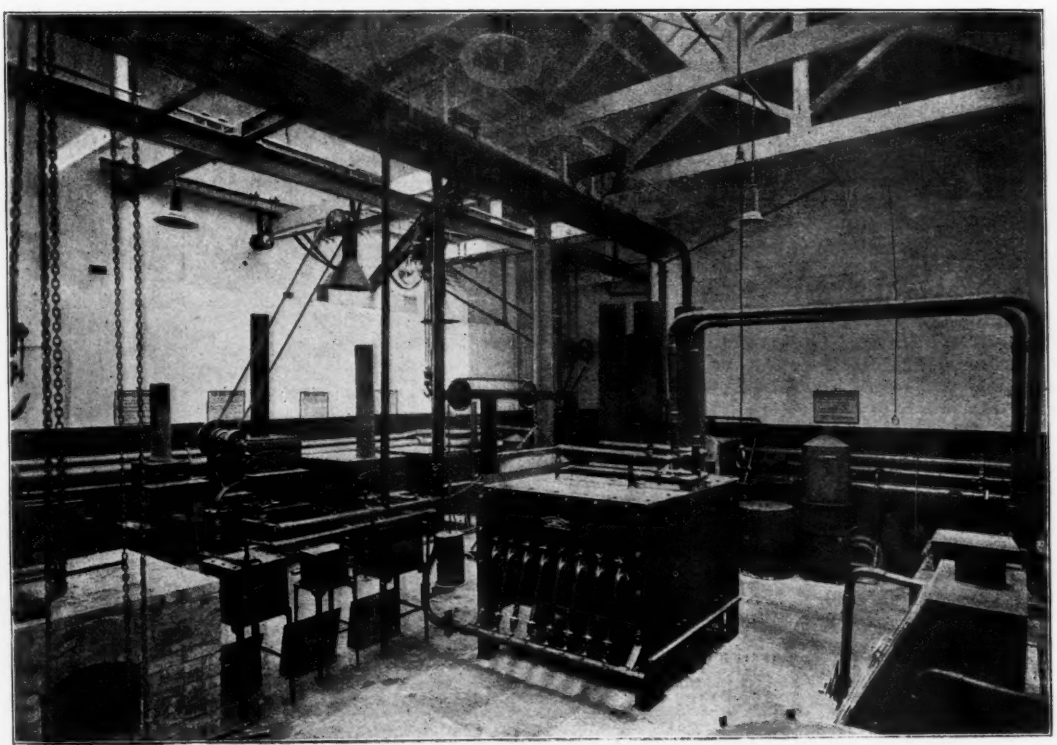


Fig. 17.—Furnace Demonstration Room of the Sheffield United Gas Light Company.

demonstration rooms. London is still found as progressive as ever. The Gaslight and Coke Company will shortly have a spendid example of how industrial gas apparatus should be shown, accompanied by practical results and figures of value to the various trades. The Commercial Gas Company, also, have fitted up an excellent demonstration room.

The Sunderland Gas Company have quite recently installed a permanent furnace demonstration plant, which is being well patronized by the large engineering firms in the Wear district; and I believe the Company are fully satisfied with the early results.

My first suggestion, therefore, is that every gas undertaking of any considerable size should consider the demonstration and experimental room as a necessary part of their sales business. If a special and separate room cannot be provided for this purpose, then some distinct portion of the existing show-room might be reserved for industrial appliances, or, where space is not available for this, accommodation at the works could doubtless be found. The apparatus installed there could not possibly include every trade appliance; but a good selection could be made specially applicable to the locality and businesses to be catered for.

The demonstration rooms to which I have referred, established in London, Sheffield, Birmingham, Sunderland, and Glasgow, are mainly equipped with furnaces; and though in these centres the class of apparatus required is chiefly of this kind, I advocate a very much more general exhibit. This is, of course, a matter for individual decision, which must be guided by the trades in the district. My suggestion for a demonstration room could not in the case of the smaller undertakings be carried out, nor would they have the scope for a permanent room of this kind; but if the motto of the British Commercial Gas Association could be applied, "All for one, and one for all," I see no reason why the larger companies in given areas should not arrange for their rooms to be used by the surrounding smaller concerns. It would be of great value to them to know that such a room existed which was available to them for giving a practical demonstration to a possible industrial consumer.

In addition to this suggestion for the smaller undertakings, it should not be forgotten that the manufacturers of industrial apparatus have their demonstration rooms at their works, and are able, with very little notice, to show what can be accomplished in almost any well-known trade. In fact, from my own experience, I know how much has been done in convincing a consumer by visits of this kind, and the interest which has been created by showing not only the results, but explaining in detail the method of working. For instance, quite recently a very large manufacturer was brought a distance of 200 miles by a gas engineer whose company were progressive enough to be willing to pay all the expenses of the visit, which took two days, and which resulted in an installation of industrial apparatus that will give a consumption of 12,000,000 to 13,000,000 cubic feet of gas per annum.

I could give many other similar instances of successful conversion of manufacturers by demonstration; and, in passing, I would say that the manufacturer and tradesman is a far more progressive man to-day than was the case a few years ago. He is on the look out, as we all are, for any prospect of reducing the costs of manufacture; and as the first number of "A Thousand and One Uses for Gas" puts it: "In these days of industrial unrest, the enterprising manufacturer is always ready to consider the adoption of apparatus which will decrease the amount of manual labour required for the purely mechanical part of his business." When we consider the many sound arguments used in favour of industrial gas, such as economy of space, quicker production, and the maintenance of the desired even and exact temperatures, it is safe to say that, if we approach our man, armed with the fullest knowledge of our subject, we shall certainly win our case.

Specializing in Industrial Gas.

This leads to my next suggestion, which follows as a corollary to my first one—viz., the need for a specialist to take charge of industrial work. Specializing in this particular work is, I consider, highly essential; and I refer more particularly now to the larger undertakings where scope is almost unlimited. Selling industrial fuel is quite a different proposition from selling domestic fuel gas. The industrial business is a highly specialized one; and the specialist in this work must be a well-trained man. It does not necessarily mean any change in general organization to create a position like this; but when we consider the enormous field open, it is obvious that not only is expert knowledge necessary, but a man's time will be fully and profitably occupied in being responsible for such a department.

Such men should possess a knowledge of the cardinal facts concerning gas distribution, and of the different combustible gases and their relative thermal capacities, and must be able to quickly assimilate the working conditions of the numerous and varied propositions which will come under their notice for consideration and advice. They will need not only to deal with business which will come to the undertaking direct—but the full success of industrial gas will always lie in the discovery of new trades to which gas can be applied. Here the co-operation of gas apparatus manufacturers is essential; and I know it will readily be given.

The President of the National Commercial Gas Association of America—Mr. C. L. Holman—in his presidential address in December last, speaking on this subject, said:

> I emphasize the urgent need of high-class industrial engineering salesmen—men who are sufficiently trained to positively guarantee results of gas use to customers. Everyone talks of gas for industrial purposes more or less, and many companies to-day are endeavouring to locate men trained thoroughly along practical industrial gas lines.
>
> The field is broad; but the men to cover that field and cover it intelligently and effectively, are most difficult to find. A special course of instruction in the use of gas for industrial purposes and for other large uses would result in more actual good to the respective companies and the industry as a whole than any one commercial effort which could be put forth. I recommend that the subject be given the closest attention, and that definite and speedy steps be taken to provide ways and means for the thorough training of men to fill this much-felt want.

These are weighty words; and, coming from one of the progressive men of a country which has already gone a long way in developing this side of the gas business, they should give us much food for thought. The photograph (fig. 18), kindly provided by the Baltimore Gas Company, shows the great importance attached by them, and, I believe, many other gas companies in the United States, to the demonstration rooms already referred to, and the need for specialists for this work.

We again have to consider the position of the smaller undertakings in this matter of special representation. Much can be done by the staff which is employed for selling generally. I am, however, convinced that means should be devised to provide expert men for this work. I suggest

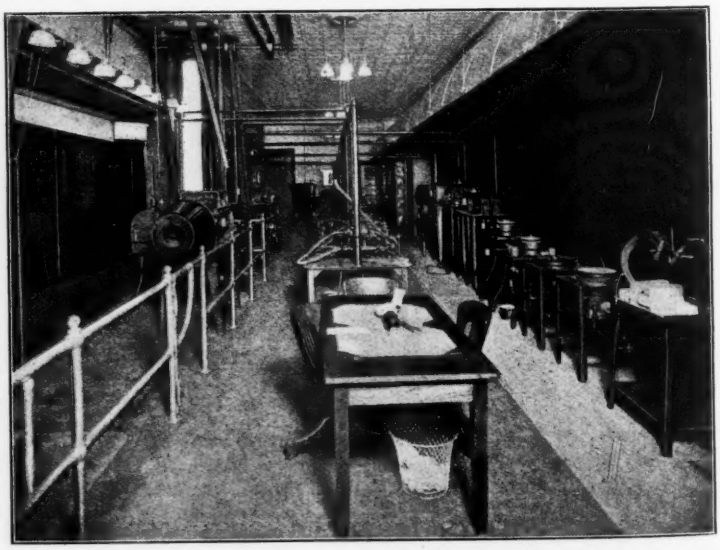


Fig. 18.—Demonstration Room, Industrial Gas Appliance Building, Baltimore, (U.S.A.) Consolidated Gas, Electric Light, and Power Company.

that this Association should consider the desirability of employing such a man, available to all subscribing undertakings. It would be the solution to the real difficulty of the smaller undertakings; and the expense could be covered either by a charge when the expert's advice was required, or by a small annual contribution by those undertakings who decided to have the option of his services. We already have a lady demonstrator at our disposal for the domestic side, why not a man for the industrial side?

Interesting Manufacturers, &c., in Gas.

Following on the creation of an industrial department, the question of interesting manufacturers and tradespeople would be a subject for local attention; but the success attending advertised demonstrations of trade appliances in America makes it certain that such a practical way here would draw attention to the subject. We are all familiar with, and know the value of, the exhibitions held so frequently for many years for the development of gas-cooking stoves—now unnecessary, unless in exceptional circumstances for educational purposes. A public exhibition of industrial appliances, either in the buildings of the gas undertaking or in a public hall, with a special invitation to the various manufacturers, traders, hotel proprietors, and others to visit and see practical demonstrations, would help forward the industrial movement.

As an alternative to local exhibitions, our Association or the various District Gas Associations might find it possible to organize in the big centres, in conjunction with the gas undertakings in a given area, a comprehensive exhibition of industrial appliances, to which for several miles round invitations could be sent to manufacturers and traders, and at which demonstrations could be given of what gas is doing and can do. This would give the opportunity for discussing their requirements, and seeing the appliances in actual operation. We have special exhibitions of machinery and of other trades, and manufacturers attend them from all parts. They would visit as readily such exhibitions as I suggest.

The subject of Press advertising of gas for industrial purposes will doubtless be receiving the attention of the Executive. In addition to newspapers and the General Press, there are many excellent weekly and monthly technical publications with a circulation covering the engineering and manufacturing centres. Manufacturers of appliances are doing a considerable amount of advertising in this direction, and with very satisfactory results.

The price of gas for industrial use has already had serious attention. I do not say it is generally necessary to make special rates; but when a very large industrial proposition is in prospect, it may be found desirable to be generous in this direction, although, even if no advantage can be shown in actual cost of fuel, the business can often be obtained on the tangible advantages which can be shown—for example, accuracy of adjustment, regulation and maintenance of temperature, cleanliness and speed of working, and saving in labour.

Inspection of Industrial Appliances.

The regular inspection of industrial appliances, which is now having constant attention, is very essential. I have seen workmen using gas-furnaces consuming far more gas than is actually required; the extra consumption being wholly due to the fact that the furnace linings were burnt out. The education of the users of industrial appliances is a most important matter; excessive consumption of gas will retard development, and bring discredit on gas as a fuel. Hence I urge that periodical inspection, where permission can be obtained, should be established. If this is done, a card system of recording installations in use is invaluable; and this can also be utilized for noting prospects of additional requirements which may be possible from time to time.

Further, a co-operative record could be established at the offices of our Association to which all members would regularly send brief particulars of every new installation of industrial gas apparatus. This record, for which possibly the appendix to this paper would serve as a nucleus, could be open for reference to all members, and would undoubtedly be of assistance and prove a guide to all undertakings on the look-out for further means of developing industrial gas consumption. Possibly our Editor could find space in the "Bulletin" to record particulars sent each month.

In conclusion, I wish to express my thanks to all who have so generously given me information and particulars. It has, however, only been possible to include some of the details which have been sent in response to my letters. Nevertheless, thanks are due for help which engineers and managers throughout the country have given me; and I desire to acknowledge the help of those who, like myself, are interested in the manufacture of gas apparatus, and who have been most willing to supply me with details of trades for which they have made appliances.

My object has been to interest those engaged in the selling of gas with the possibilities of industrial development; and I look confidently forward to a great future for the subject of my paper. I have unlimited belief in the future of the industry we represent. No industry has ever been developed which has been of more benefit to the public at large. The history of gas manufacture and supply is replete with the most absorbing interest to those outside the business as well as to us. We know we are working not merely for private gain but for public service. Every industrial gas appliance we instal in place of a coal appliance is a step—and that not a small one—in the solution of the problem of a purer atmosphere; and I am satisfied that we can look forward cheerfully and hopefully to the advancement, and to the more general adoption of industrial gas.

APPENDIX.

List of a few of the Industries in the British Isles known to be using Gas.

(Compiled with the assistance of information kindly provided by many gas engineers and managers, and by gas appliance manufacturers).

Industry, trade, or profession.	Appliance used, or operation carried out with Gas.
Advertising	Flashlights and other signs.
Aeroplane Makers	Brazing hearths.
" "	Case hardening furnaces.
" "	Enamelling ovens.
Agriculture (Board of)	Apparatus for bacteria research work.
Agricultural Implement Makers	Forging and hardening furnaces.
" "	Gas-heated chambers to dry emery bands.
" "	Hardening by lead baths.
" "	Heating tables for lacquering.
Aluminium Works	Crucible furnaces for running aluminium bars for rolling mill.
Aluminium Castings Works	Core drying ovens.
" "	Furnaces for melting.
Art Metal Works	Brazing furnaces.
" "	Lacquering apparatus.
Art School	Enamelling furnaces.
Assayers	Muffle furnaces.
"	Crucible furnaces.
Bakers	Bread baking machines.
"	Muffin plates.
"	Proving ovens.
Bedstead Makers	Japanning ovens.
Billiard Ball Manufacturers	Heating ovens.
Biscuit Wafer Manufacturers	Automatic baking ovens.
Bleachers	Machines for singeing cloth.
Boiler Makers	Brass crucible furnace for casting brass boiler fitments.
Bookbinders.	Glue pots.
Boot Manufacturers	Boot finishing machines.
" "	Boot sewing machines.
" "	Iron heaters.
" "	Wax melting.
Boot Polish Manufacturers	Drying enamel on tins.
Bottle Makers	Branding boxes.
Brass Founders.	Crucible furnaces for melting.
" "	Core drying ovens.
Brewers	Beer boiling.
"	Branding cask heads.
"	Water boilers.
"	Sugar boiling.
Brewers' Engineers	Blow-pipes.
Brick (Fire) Makers	Furnaces for testing bricks.
Brush Manufacturers.	Glue pots.
" "	Melting pitch.
Button Manufacturers	Rotary annealing furnaces.
Cabinet Makers.	Large ovens for stoving bedding.
Calico Printers	Gassing frame for singeing calico.

Industry, trade, or profession.	Appliance used, or operation carried out with Gas.
Cane and Basket Manufacturers	Burners for bending cane.
" " "	Gas irons.
Cardboard Box Manufacturers	Apparatus for heating gold stampers.
" " "	Glue pots.
Carriage Builders	Japanning ovens.
Cement Manufacturers	Laboratory apparatus.
Chandelier Makers	Brazing hearths.
" "	Lacquering stoves.
Chemical Laboratories	Muffle furnaces, &c.
Chemists	Boiling burners for manufacturing mineral waters.
" **(Analytical)**	Muffle and sundry other furnaces.
" **(Manufacturing)**	Stove for drying chemicals.
" "	Sundry gas-heated apparatus, muffles, drying ovens.
" "	Combustion furnaces, burners, &c., &c.
Chemical Manure Manufacturers	Revolving kiln.
Cloth Manufacturers	Cloth singeing.
" "	Tentering.
Clothiers	Pressing irons.
Cocoa Manufacturers.	Heating pans.
" "	Roasting machines.
Collar Manufacturers.	Collar machines and irons.
Colleges	Laboratory apparatus.
Colliery	Testing miners' safety lamps.
Confectioners	Apparatus for heating plates.
"	Stoves for bon-bon making.
"	Sugar melting boilers.
Coopers	Branding cask heads.
Copper Tube Works	Blow-pipes.
" "	Brazing hearths.
Coppersmiths	Blow-pipes.
Cotton Industries	Tentering.
" "	Conditioning.
" "	Cloth singeing.
" "	Gassing frame for singeing yarn.
" "	Steaming chamber for moistening cloth.
Crane Makers	Small annealing and hardening furnaces.
Cricket Ball Manufacturers	Ovens for drying cricket balls.
Custard Powder Manufacturers	Enamelling ovens for varnishing and drying printing on sheet tin prior to manufacture into custard powder tins.
Cycle and Cycle Accessory Makers	Blow-pipes.
" "	Brazing apparatus.
" "	Enamelling ovens.
" "	Gas-heated ovens for case hardening, tempering, &c.
" "	Oven furnace for annealing drawn metal for bicycle pumps.
" "	Vulcanizers.
Cycle Repairers.	Brazing apparatus.
Dairies	Hot-water boilers, for cleansing cans.
Dairy Farmers	Egg incubators.
Dentists	Gold melting crucibles.
"	Muffle furnaces.
"	Vulcanizer.
Distemper Makers	H.P. burners.
Dyers	Ironers.
"	Machines for finishing cotton cloth.
"	Singeing machines for velvet.
Edge Tool Works	Sundry furnaces, muffles, salt baths, &c., &c.
Electric Appliance Makers	Crucible furnace for melting metal for casting work.
" " "	Drying kiln for electric motor armatures.
" " "	Soldering irons.
" " "	Japanning ovens.
" " "	Melting metal for accumulator castings; warming the iron moulds into which the molten metal is run.
" " "	Ovens for heating and drying non-inflammable insulating material.
" " "	Tempering furnaces for tools.
Electrical Engineers	Oven furnaces for annealing, &c.
Electric Lamp Manufacturers	Blow-pipes.
" " "	Filament carbonizing furnace.
" " "	Seal making.
" " "	Wire joining.
" " "	Drying ovens for arc lamp carbons.
Electro Platers	Enamelling ovens and various vats.
Electro Plate Manufacturers	Annealing furnaces.
" " "	Blow-pipes.
Enamellers	Crucible for melting glass enamels.
"	Enamelling muffles.

Industry, trade, or profession.	Appliance used, or operation carried out with Gas.
Engine Builders	Hardening and case hardening furnaces.
Engineers	Annealing furnaces.
"	Brazing hearths.
"	Core drying ovens.
"	Enamelling stoves.
"	Hardening and tempering of numerous tools.
"	Small forging furnaces.
"	Tool hardening furnace.
"	Tyre heater for expanding waggon tyres.
Fire Extinguisher Manufacturers	Stoving enamel on fire extinguisher cases.
Fish Hook Makers.	Furnaces for hardening and annealing.
Fish Shops	Fish fryers.
Fruit Importers.	Bunsen burners for banana ripening.
Furniture Makers	Glue tanks.
Gas Mantle Manufacturers	Apparatus used in manufacture.
General Engineers.	Sundry hardening and annealing furnaces.
Glass Industries	Gas-heated ovens and muffles for bending plate glass, moulding lenses, &c.
" "	Gas jets fixed under slate slabs for evenly heating sheets of glass while being silvered.
" "	Special still for making distilled water for glass silvering.
" "	Glass kiln for firing stained glass.
" "	Blow-pipes for sealing tubes, thermometers, &c.
" "	Muffles for heating and finishing bottles.
" "	Annealing furnaces.
" "	Furnace for tempering tumblers.
" "	Rounding off sharp edges after cutting.
Glassware Manufacturers	" Glory holes."
Gold Refiners	Crucible and oven furnaces.
Goldsmiths	Crucible furnaces.
Government Dock-Yards.	Various gas furnaces for hardening shops.
Gramophone Record Manufacturers	Heating copper plates for tinning to make moulds for records.
" "	Boilers for melting wax.
Gramophone Record Manufacturers	Case hardening furnaces.
Grocers	Coffee roasters.
Gun Manufacturers	Annealing and case hardening furnaces.
" "	Brazing breeches on rifles.
Hairdressers	Heating water.
Hat Manufacturers	Hat blocking machines.
" "	Ironers.
" "	Stoves and bunsen burners for finishing.
Hollow-ware Manufacturers	Annealing furnaces for german silver hollow-ware.
" "	Japanning ovens.
" "	Tinning stoves.
Hosiery	Iron heaters.
Horse Trainers and Breeders	Drying horse clothing.
" " "	Singeing machines for horses.
Horticulturists	Greenhouse heaters.
Hospitals	Central-heating plant for operating theatre.
"	Ovens for disinfecting.
"	Surgical instrument sterilizers.
Ice Cream Makers	Water boiler for sterilizing milk.
Iron Founders	Enamelling stoves.
Iron Smelters	Muffles in laboratory for analyzing.
Iron Works	Sundry laboratory furnaces.
Japanners	Japanning ovens.
Jewellery Manufacturers	Crucible furnaces.
" "	Muffle "
" "	Oven "
Joiners	Glue-pot heating.
Lamp Manufacturers	Annealing furnaces.
" "	Blow-pipes for spinning-annealing.
Laundries	Collar and shirt ironing machines.
"	Goffering irons.
"	Conditioning.
"	Drying frame.
"	Smoothing irons.

Industry, trade, or profession.	Appliance used, or operation carried out with Gas.
Laundries	Wash boilers.
Lead Works	Muffle furnaces for assaying.
" "	Pots heated by gas-rings for lead and metal melting.
" "	Special process for distilling.
Leather Workers	Creasing iron heaters.
Lithographers	Furnaces for hardening and annealing dies.
Local Authorities	Analyzing river water.
" "	" sewerage and bacteria beds.
" "	Water heaters for washing tram-cars.
Locomotive Works	Shrinking on locomotive tyres.
" "	Various furnaces for hardening shops.
" "	Soft metal melting pots for bearings.
Machinists	Hardening and annealing furnaces.
Maltsters	Malt roaster for preparation of black malt.
Marine Engineers	Brazing turbine blades and shrinking on rotors.
" "	Hardening and case hardening furnaces.
Marine Engine Works	Blow-pipes.
" " "	Brazing hearths.
" " "	Hardening furnaces, &c., for tool room.
Metal Stampers	Annealing furnaces.
Metal Workers	Enamelling stoves.
" "	Blow-pipes.
" "	Tinman's stoves.
Metallurgical Laboratory	Muffle, combustion and sundry other furnaces.
Metal Makers and Repairers	Brass and soft metal melting furnaces.
" " "	Soldering irons.
" " "	Torches for testing tightness of cases.
Milliners	Crimping irons.
Mineral Water Manufacturers	Drying bottles.
Mining Appliance Manufacturers	Furnaces for hardening and tempering tools.
Mining and Agricultural Implement Makers	Case hardening, forging and other furnaces.
Mining	Small retorts for sampling coal.
"	Testing colliers' lamps.
Motor Proprietors	Garage heaters.
Motor Bus Repairing Shops	Annealing and hardening ovens.
Motor Car and Motor Cycle Manufacturers	Blow-pipes.
" "	Brass, aluminium and soft metal melting furnaces.
" "	Case hardening furnaces.
" "	Hardening and annealing furnaces.
" "	Testing motors.
" "	Tinman's stoves.
Motor Body Builders	Brazing forges.
" "	Furnaces for case hardening, hardening, &c.
" "	Japanning ovens.
Motor Car Repairers	Oven furnace for annealing cylinders before applying oxy-acetylene weld.
Motor and Cycle Chain Makers	Annealing furnaces, case hardening furnaces, hardening furnaces.
Mustard Manufacturers	Soldering irons.
Needle Makers	Furnaces for hardening and annealing.
Newspaper Proprietors	Furnaces for drying matrix.
" "	Type casting machines.
" "	Type melting crucibles.
Oil Merchants	Oil refining tanks.
Oil and Grease Manufacturers	Making and mixing greases.
Oil, Grease, and Bitumen Manufacturers	Bitumen composition, melting, mixing, &c.
Optical Appliances	Fusing lenses.
Optical Works	Annealing furnaces.
" "	Blow pipes.
Ordnance Works	Annealing furnaces.
" "	Brazing furnaces.
" "	Case hardening furnaces.
" "	Drying foundry moulds.
" "	Heating billets for extrusion process.
" "	Various hardening furnaces.
" "	Various tempering furnaces.
Packing Case Makers	Branding cases.
Paint Makers	Heating caustic vats and boiling varnishes.
Pastry Cooks	Pastry ovens.
Pen Manufacturers	Annealing and hardening furnaces.
Photographer	Print dryer.
Plasterers' Contractors	Boiler for heating gelatine.
Platers	Nickelling and lacquering stoves.
Pork Butcher	Machines for singeing carcasses.
Pottery	Kilns for glazing and drying, &c.
Poultry Breeding	Incubators.
Printers	Glue kettles.
"	H.P. boilers raising steam for presses.
"	Type casting machines.
"	Type melting pot furnace.
Printing Ink Manufacturers	Gelatine making for ink rollers of printing machines.
" " "	Heating compositions for varnish making.
" " "	Oxidizing oil and varnish making.
Provision Merchant	Ham boilers.
" "	Ham curing.
Railway Waggon Building	Heating tyres for shrinking on to wheels.
Radiator Manufacturers	Brazing furnaces.
Refiners	Muffle and crucible furnaces.
Research Laboratories	Muffle furnaces.
" "	Crucible furnaces.
" "	Combustion furnaces.
" "	Drying ovens.
" "	Heating plates.
" "	Various burners.
Rivet Makers	Heating brass bars.
Rolling Mills	Annealing furnaces.
" "	Tempering.
Rubber Merchants	Vulcanizing plant.
Saddlers	Blow-pipes for brazing metal work.
Sauce Manufacturers	Boiling coppers.
Sculptors	Bronze casting ovens.
Seedsman	Germinating seeds.
Sewing Machine Makers	Furnaces for heating steel strips.
"	Annealing furnaces.
"	Brazing furnaces.
"	Case hardening furnaces.
"	Various hardening furnaces.
Shipwrights	Annealing furnace for coppersmith's work.
Ship Breakers	Oxy-hydrogen coal gas apparatus.
Ship Repairers	Special gas-burners for heating brass liners prior to shrinking on propeller shafts of ships.
" "	Compressed air and gas for heating ships' propellers for shrinking on to shaft.
Shoe Manufacturers	Iron heaters.
" "	Shoe finishing machines.
" "	Shoe sewing machines.
" "	Wax melting
Silversmiths	Muffle furnaces.
"	Crucible furnaces.
Soap Makers	Furnaces for laboratory use.
Spring Manufacturers	Hardening, tempering, and enamelling stoves.
Steel Founders	Pre-heating steel castings for autogenous welding.
" "	Foundry mould drying.
Steel Forgers	Apparatus for shrinking sleeves on propeller shafts.
Steel Makers	Annealing furnace.
" "	Muffle and sundry laboratory apparatus for analyzing.
" "	Oven furnace for annealing steel discs and press tools and steel tubes.
Stove Makers	Japanning ovens.
Stove Enamel Makers	H.P. burners.
Sweet Manufacturers	Boilers for making butter scotch.
" "	Heating pans.
Tailors	Pressing irons, &c.
Tallow Chandlers	Concentric ring burners for heating copper for melting fat.
Tar Works	Laboratory apparatus.
Technical Institutes	Laboratory apparatus.
Telephone Apparatus Manufacturers	Annealing furnaces.
" "	Case hardening furnaces.
Territorials	Gas-heated hot-air oven for destroying vermin (if any) in returned army clothes.
Textile Manufacturers	Singeing machines.
Timber Merchants	Branding cases.
Tin Plate Workers	Soldering irons.
Tinsmiths	Special annealing plant.
"	Tin melting vats.
Tin Stampers	Baking ovens for embossed and enamelled tins.
Tobacco Importers	Heating plates and blending tables.

Industry, trade, or profession.	Appliance used, or operation carried out with Gas.
Tobacco Manufacturers .	Cigarette packing machines.
" " .	Drying tobacco.
" " .	Gas-heated rollers for drying gum on packets.
Tool Makers	Hardening, tempering, and forging furnace.
Torpedo Factory (Govt.).	Furnaces for annealing shell plates.
Tube Makers	Malleable iron pipe welding.
" "	Annealing ovens for annealing drawn tubes.
" "	Gas-heated tube brazing furnace for brass and steel tubes.
Vaccine Factory . . .	Lymph manufacture.
Varnish Makers . . .	Gas-heated pans for boiling varnish.
Vinegar Manufacturers .	Heating pans.
Weighing Machine Makers	Drying stoves.
" " " .	Hardening stoves.
Wire Manufacturers . .	Hardening and tempering furnaces.
" " . .	Lead bath furnaces.
" " . .	Bunsen burners.
" " . .	Wire annealing furnace.
" " . .	Tinning of steel wire.
Wire Drawers	Brazing broken wires.
Wire Rope Manufacturers	Analyzing steel.
" " " .	Annealing draw plates.
Wood Workers	H.P. boilers for raising steam.
Worsted Spinners . . .	Gassing frames for singeing yarn.

Discussion.

The PRESIDENT (Mr. Edward Allen): Gentlemen,—We have been privileged to hear a most interesting paper. The letterpress is of excellent quality, the illustrations could not be better, and the manner in which our friend Mr. Thornton has read it also deserves the highest commendation. There are several gentlemen who wish to speak on the paper. Therefore I will not take up the time with any remarks of my own, but I will call upon Mr. Barrett to move a vote of thanks to Mr. Thornton, which Mr. Clare will second.

Mr. S. R. BARRETT (Birmingham): Mr. President and gentlemen,—I have been called upon at rather short notice to propose a vote of thanks to Mr. Thornton for what, I think, is really a marvellous illustration of the application of gas to various industries. The paper that has been read appeals to me as a practical man who has gone through the stony road of the flat-flame burner to the modern high-pressure burner. It also appeals to me as a directory which will be of the greatest value to everyone connected with the gas industry. We can learn a great deal from the paper; and we can see also from it at a glance the latest results achieved. In raising steam on the scale that Mr. Thornton has referred to, I think with high-pressure gas we have at our hands unknown areas for future development. The ease with which high-pressure gas can be utilized without the deposit of carbon is of itself sufficient guarantee of its future success. I notice a little further on Mr. Thornton refers to the use of gas under steam-boilers. There is in the paper a very interesting illustration which brings back to my memory many years ago, when Colonel Makins had a much larger installation than the one illustrated at Lowther House, which was heated in the same way. I am speaking of thirty years ago. There was an installation of 800 feet of 4-inch pipes, which were warmed by luminous gas. It was warmed successfully and economically; and why on earth it did not come to the forefront at once, I cannot understand. Colonel Makins did his best; but there was no response. As I have said, the installation was practically the same as the one in the paper.

With reference to the gas-making industry in Birmingham, we have gone a long way in connection with the development of the use of high-pressure gas, and great success has rewarded our efforts. Throughout, the advantage in the use of gas for manufacturing purposes is its simplicity. With high-pressure gas we have absolute control. With the bunsen burner we have no soot; and from these two factors we have a certainty of carrying economy into the furthest ramifications of all sorts of trades. We have a thousand trades in Birmingham; and, as Mrs. Brereton has said, it was necessary that the gasman should know even more than the foreman. Though the gasman should not know more than how to achieve the results which the foreman required, he should know more as to how to adapt the gaseous fuel to the purposes he desired. The reference to the Lehr type of furnace is very interesting to me, because I know it so well. I am alluding to a Lehr furnace, 60 feet long, which is warmed throughout by ordinary bunsen burners. We are using high-pressure gas, I grant you, because there is already a high-pressure installation in this particular glass-works; but there is not the slightest reason, to my mind, why the ordinary bunsen flame should not achieve exactly the same results. Kilns for stained glass are very familiar in the Midlands, and have been in use for many years; but in connection with them there is one thing that struck me which it would be very interesting to point out to gas engineers—that there is great difficulty in the kiln for stained glass in the application of the flame to the iron bridge which separates the flame from the glass on which the painted material is put. There must be a total absence of sulphur. Now, it is up to us to introduce some very great improvement in connection with this, in much the same way as manufacturers of gas-fires have introduced improved radiants and shown how greater efficiency can be obtained by the introduction of scientific methods. Great success has followed from the use of gas for baking. Mr. Thornton refers to 400 trades in which gas can be used. There must be even more. At any rate, there is a very vast field for the employment of gas. In connection with the suggestion that has been made with regard to laboratories and factories, we find that the manufacturer has first of all the greatest desire to learn, and, secondly, the greatest desire to keep his own particular secret. Now, with the gas industry, when a laboratory is placed in the hands of a manufacturer under sealed orders, good results always are obtained. The gas consumption is ever on the increase. I may say that the last degree of temperature is the most difficult to obtain in connection with gas; and we have ourselves to do our utmost to get this last degree at the lowest possible cost. I have the greatest pleasure in moving a hearty vote of thanks to Mr. Thornton for the estimable paper which he has put before us, which I am sure will be of the greatest value to the industry.

Mr. CHARLES CLARE (London): Mr. President and gentlemen,—I have very great pleasure in seconding the vote of thanks to Mr. Thornton for his useful and entertaining paper. He has touched on a vast field for the application of gas.

The resolution was passed unanimously.

Mr. CYRIL DAVIS: Mr. President, ladies, and gentlemen,—I will be very short in the remarks I have to make. In the first place, I would like to take this opportunity of endorsing the words that have fallen from the lips of Mr. Barrett and Mr. Clare with regard to the very excellent paper Mr. Thornton has given us. I would also like to add my appreciation of the very clear and thorough way he has placed the paper before us. I notice Mr. Thornton refers to the assistance he has received from various firms that are interested in the manufacture of gas apparatus for industrial purposes; and I am struck with the spirit of co-operation that has been preached by the Association. This spirit bears good fruit from what we have learnt in the very early stages of the Association we are all so proud to belong to. A point I have in mind is that we have not referred in any way whatever to the very excellent pioneer work of our late esteemed friend Mr. Thomas Fletcher. [Applause.] Mr. Fletcher was, indeed, a pioneer, and did an enormous amount of good to the industry. In his early days he devoted his time to work which probably then was not profitable to him; but it was work which he believed was for the good of the industry, and his foresight has proved to be correct. We know it is due to the work he did that we are able to have appliances which are so successful for dealing with gas for furnaces and other industrial purposes which we have heard about to-day from Mr. Thornton, and which he has dealt with in his paper in such a thoughtful manner. At the luncheon to-day, Mr. Jones stated that his limits were pretty well reached with regard to gas for lighting, but that he had been able to make very great strides in the use of gas for industrial purposes. This will be an encouragement to many of you. When you have had a chance of re-reading the paper, you will have some opportunity of advancing the consumption of gas that you did not know of before; and no doubt many gas salesmen will take the trouble to investigate what means there are for selling gas for other purposes than those for which it is used at present. I do not know

what the Executive Committee propose to do with regard to this paper; but it has occurred to me it and the other valuable papers we have heard should be placed in the hands of the non-subscribers. No doubt when the consumption of gas goes up the receipts will be increased, and we shall be able to spend more money in getting converts.

Mr. GOODENOUGH: Mr. President and gentlemen,—On behalf of the Executive Committee, might I say that, if the members generally would intimate at the earliest possible date whether they require any number of any or all of the papers for circulation among members of their staffs, we should be glad to hear from them. I can think of no more valuable work for them to do than to see that these papers are placed in the hands of every member of the staff. We should be able to supply them merely at the cost of printing. While I am on my feet, may I express my appreciation of the valuable paper Mr. Thornton has presented to us, and say that until we heard his paper read I do not think we ourselves really realized what a universal servant to man gas is. Our hats, our collars, our clothes, our buttons, our jewellery, even our walking-sticks, all owe something to gas in their production; and even with regard to bananas it is used for ripening. Then, again, there is the sugar we sweeten our fruit with, the stained glass that we look through when we go to church, the beds we go to sleep in, the fire extinguishers we use to put out a fire—all these owe something to gas. If there is any man who is so misguided as to use electric light, we see gas is made great use of in producing electrical apparatus. I would only remind members of the publication that Mr. Thornton referred to—namely, "The Thousand and One Uses of Gas," and to express the hope that this will be more and more widely purchased and circulated, because I believe that the constant distribution of the publication in our districts will sow a seed from which a rich harvest will be reaped in years to come. The suggestion as to more Press advertising will receive consideration. After all, it is a question of £ *s. d.* If you will all, when you go home, get your boards and councils to subscribe 5s. instead of 2s. 6d. a million feet, of course, we can do a lot more.

Mr. THORNTON: Mr. President and gentlemen,—I have nothing to say in reply beyond this—that if I have added anything to the advancement of the industry, I am well rewarded for any time and trouble I may have spent in the preparation of my paper. I am quite convinced that if you do study the industrial question, you will be as surprised as I have been myself with the possibilities that there are for gas consumption. I am quite certain you will find it materially add to your profits if you will look into it.

The PRESIDENT: If in consequence of the time being limited there are any gentlemen present who would like to have spoken, but have not come forward, I will ask them to send their communications to the "Bulletin."

Mr. H. TOWNSEND (Wakefield) sends the following communication, in response to the President's suggestion as to the printing of any further comments on the paper.

I consider Mr. Thornton's paper one of the most useful that has ever been laid before us, and it has come at the psychological moment. Two days before the opening of the exhibition, we received a communication from one of our consumers stating that the cost for gas used by his metallurgical furnace was so great that he would have to take it out and substitute a solid-fuel furnace, unless we could see our way to make a great reduction in his account. Accordingly I called upon him, taking with me one of my assistants, who is our expert in such matters. We found that one of the causes of the large consumption of gas was the bad construction of the furnace. I offered the services of my assistant to try and overcome this difficulty, and to make periodic calls to see that the furnace was kept in order, and to advise the men using it. This offer was gratefully accepted. My assistant had to come up to the exhibition next day, as he had undertaken to act as stallholder for the first fortnight. I told him to pay particular attention to the furnace department, and get all the information he could. While he was away, our consumer agreed to thoroughly overhaul and clean his furnace; and I agreed to fix a special meter to record the consumption on this furnace alone.

Upon the return of my assistant, I at once sent him down to see what he could do with the furnace. He accordingly took it to pieces, and brought to me the inefficient parts which were causing the heavy consumption of gas. It was at once apparent that it was beyond our resources to improve them; so we sought the aid of Mr. Thornton's firm, who kindly sent their expert over. He and my assistant then called upon the consumer; and as a result he will, I feel sure, be persuaded to substitute one of Mr. Thornton's furnaces, under the guarantee of such a reduction in the consumption of gas as, together with some concessions with regard to price, will effect the economy necessary to prevent the substitution of a furnace using solid fuel.

We then, in the advertisements in our local papers, drew special attention to the splendid display of metallurgical furnaces to be seen at the exhibition, and advised all our consumers who were interested to call and see it, and backed this up by sending admission cards to them all. I then sent my assistant to call and interview them. He found them all, without exception, keenly interested in the subject, and desirous of having all the information he could give them. While he was engaged in this canvass, I received a copy of Mr. Thornton's paper, which I showed to my assistant. Upon looking it through, he asked if he might take it with him, as it would be a great help to him to be able to show the consumers photographs of up-to-date appliances for the particular form of work they were themselves engaged in; and he is now using Mr. Thornton's paper for the purpose—a liberty which I hope that gentleman will pardon.

This canvass bids fair to be extremely fruitful; and we look forward to some very useful additions to our consumers of gas for industrial purposes—more especially as I think I am correct in stating that all the appliances described in Mr. Thornton's paper are for use with gas at ordinary pressures. As our metallurgical consumers are spread about all over the district, it would be a very expensive matter to give them a supply of high-pressure gas such as our friends in Birmingham have found so useful.

I therefore beg to tender to Mr. Thornton my best thanks for his paper, which will be most useful, and will, I have no doubt, become the text-book on this important subject.

Mr. R. HALKETT (Glasgow) writes: I am pleased to have the opportunity to say a few words on this important subject, which Mr. Thornton has put before us in so lucid a manner.

In our large towns and cities, there is a great field for gas-furnaces, &c., and one that we are only on the brink of for increase of consumption. It is adaptable for all trades; in fact there is hardly a trade in which gas cannot play a very important part for manufacturing purposes.

In Glasgow, we have furnaces in the shipbuilding works, locomotive works, general engineering works, &c., and all giving great satisfaction.

Only a few weeks ago my attention was drawn to the fact that a glass-works since adopting gas-furnaces has been able to regain work (such as advertisements of all kinds fired in various colours) that had gone to Germany and other places abroad.

A point which I am pleased to see that Mr. Thornton makes, is specializing. Undoubtedly, it is one of the parts of our enterprise which we have pushed the least, and therefore one that we have the least experience with.

I do not think there is any branch of our profession in which we come in touch with the engineer more than in that of gas-furnaces. It is, therefore, essential that for this line we should have an expert, and one who thoroughly understands his business, and is able to recommend the proper appliance to suit the work. First impression is everything; and if one feels he has a thoroughly practical and reliable man to deal with, it often results in business; whereas if on the first question or two the adviser falters, he gives the idea that he is not familiar with his subject and appliance, and the probable consumer feels he does not justify his case, and there the matter rests. A good plan is to have a furnace-room fitted up with the appliances ready for work. This we have at Glasgow; and any consumer can there see the furnace in operation, and, if he cares to bring the material, is welcome to test for himself, and we hope in this way to obtain good business.

I had hoped that Mr. Thornton would have given us his opinion with reference to high-pressure gas, and low-pressure gas with air under pressure, for furnaces, for at the present time there is certainly a difference of opinion.

A CENTURY OF DEVELOPMENT IN THE USE OF COAL GAS FOR LIGHTING AND HEATING.

Abstract of a Lecture by Professor VIVIAN B. LEWES, F.I.C., F.C.S.

Mr. EDWARD ALLEN (President of the British Commercial Gas Association), at the opening, said: It is my duty to introduce Professor Vivian B. Lewes to you; but it is quite a superfluous duty, because you know Professor Lewes as well as I do, as he has illuminated our conferences and every important meeting in connection with the gas industry for some years. He is, however, no older, though this has occurred. To-night he will favour us once more with one of his lectures. You will find, I have no doubt, many new matters; and the whole lecture will be full of interest and information.

Professor LEWES then delivered his lecture; remarking that just one hundred years ago, when George the Third was king, the first practical installation of gas lighting, under the auspices of the Chartered Gaslight and Coke Company, took place in the illumination of Westminster Bridge; and two years later the beneficent rays of gaslight had penetrated to the Guildhall, where the beams from the cockspur burner made doubly cheerful the civic banquets of those days. From that time to the present day the history of the gas industry has been one of constant advance—sometimes slow, often rapid, but never equalling that of the last decade, which has not only given gas an unassailable position both for lighting and heating, but has also shown it to be, under modern conditions, the most hygienic agent for both these purposes.

As we glance back to the inception of the gas industry, three names stand out from the multitude of early workers as being inseparably connected with its success: Murdoch, the clear-headed inventor and philosopher, who not only showed the possibility of applying to lighting purposes the gas obtained by the distillation of coal, but also made the application; Winsor, the wild enthusiast, who, with the minimum of knowledge and the maximum of effrontery, beat the idea of gas lighting into the unwilling skulls of an unbelieving public, and cajoled the first Charter from a doubting Parliament; and, finally, Samuel Clegg, pupil of Murdoch and skilled engineer, who, when the Charter had been granted, the Company formed, and its assets nearly squandered, joined the Chartered Gaslight and Coke Company in 1813, and by his skill turned the tide of fortune—not only saving gas lighting from a crushing failure, but converting it into the brilliant success that formed the basis of our more modern advances.

In tracing the wonderful development that has taken place in lighting during the century that has elapsed since Murdoch first burnt coal gas, and the wonder of his flame without a wick astonished the world, down to the present time, when high-pressure incandescent lamps give a hundred times the light developed from a given volume of gas that was possible with the original burners, we find that the advances fall naturally into two periods. The first was that in which light was emitted by the incandescence of carbon particles generated within the flame by the decomposition of hydrocarbons in the gas, and which, starting with Murdoch's cockspur burners that gave less than a candle unit of light for each cubic foot of gas consumed per hour, was increased gradually in efficiency by improvements, until the regenerative burners employed in the last twenty years of the Nineteenth Century gave seven candles for the same gas consumption. The second period commenced with the discovery by Welsbach that, if the gas was burnt to a non-luminous flame in the atmospheric burner, the carbon particles could be replaced by others radiating a far higher degree of light. This led to the production of the incandescent mantle, which, passing through various phases of improvement, now yields 60 candles of light per cubic foot of gas consumed in high-pressure burners.

The discovery that more than any other led to advance was that of the atmospheric burner, due to Professor Bunsen, who in fitting up his laboratories at Heidelberg utilized a suggestion made by Sir Henry Roscoe, and devised the burner which now bears his name, and which not only made the incandescent mantle a possibility, but also led to the utilization of coal gas as a fuel. The strides made by gas so employed are as great as for lighting; and the gas-fire, gas-cooker, and gas-engine have practically levelled the load in gas manufacture, and here in the City of London have rendered possible industries that the crowded area would have made impracticable had coal fired boilers and steam-engines been a necessity for the production of power.

It is, however, in the region of hygiene that the great advances of the last decade have been made. The fact that gas lighting, by setting air in motion, promotes ventilation and prevents the stagnation of air which in a dwelling-room, shop, or factory is fatal to health, is now realized fully by the leaders of the medical profession; while the perfecting of the gas-fire, since it was made clear that radiant and not convected heat was the only healthful way of warming a room, has removed the last objection to the use of coal gas as a domestic fuel. The rapid advance of the gas-stove is one of the most remarkable features in the progress of the industry.

The last thirty years of the Nineteenth Century were marked by the cumulative effect of smoke cutting-down to a minimum the needed vitalizing action of the sun in our great cities, and causing such increase in the number and density of fogs as to be not only a menace to health but a national disgrace. The wide introduction of the gas-stove seems already to have improved this condition. One-sixth of our chimneys have ceased to add their quota of smoke to the atmosphere, and the registers show 84 more hours of sun than before; while the cleansing of the fog is a still more marked result.

Glancing at the marvellous progress of the past, it seems scarcely possible that the future can hold further advances to compare with them in magnitude; but I am much mistaken if we have more than touched the fringe of the possibilities that exist in the use of gas. The flat flame is to all intents and purposes dead as regards its use for lighting, and the fads of the few who decline to march with the times should not be allowed to stand in the way of progress. The next advance—and it will come very shortly—is the realizing that standards of illuminating power mean nothing, and that the calorific value of a gas supply means everything. With the abolition of parliamentary requirements as to candle power, and the substitution of a reasonable calorific standard, the gas companies will be able to supply a gas of uniform value at a fairly high pressure, and reduce the price—a step which, by still further popularizing the use of gas as a fuel, will add to the cleanliness and health of our homes, purify our town air, and last, but by no means least, economize our rapidly decreasing store of coal, on which the supremacy of the Empire depends.

I have to thank you most heartily for the courteous way in which you have listened to me to-night. [Prolonged applause.]

Mr. EDWARD ALLEN, in proposing a vote of thanks, said: It is our place to thank Professor Lewes for the great pleasure and interest he has given us in his lecture, and not his place to thank us. Most of us are quite willing to be convinced that there is nothing like gas. If there should, however, be any person present who was unsatisfied at the beginning of the lecture, surely he is converted through the eloquence of Professor Lewes. The whole industry owes a great deal to Professor Lewes for the able and popular lectures he has been giving up and down the country; and I am sure I am voicing your feelings when I ask him to accept our very hearty thanks for his able lecture this evening.

The vote of thanks was carried with acclamation, and the proceedings terminated.

SOCIAL EVENTS.

LUNCHEON AT THE NATIONAL GAS EXHIBITION.

At the Invitation of the Metropolitan Gas Companies.

After the morning's sitting of the members of the Association on Wednesday, they were entertained at luncheon in the Banquetting Hall at the National Gas Exhibition by the Metropolitan Gas Companies—the Gaslight and Coke Company, the South Metropolitan Gas Company, the Commercial Gas Company, and the Brentford Gas Company. In the area of the last-named Company, the highly successful exhibition is being held.

Sir CORBET WOODALL, D.Sc., the Governor of the Gaslight and Coke Company, presided.

To the right of the chair, according to the printed plan of the table were: Mr. Edward Allen, the President of the Association and of the Institution of Gas Engineers, Mr. Charles Carpenter, D.Sc., Chairman of the South Metropolitan Gas Company, Mr. Alderman J. Evans, Mr. A. T. Waddom, M. L. Busine, Mr. Alderman J. Thompson, de Heer P. Bolsius, Herr K. Lempelius, Mr. F. W. Goodenough, Mr. E. A. Goulding, M.P., Mr. W. Doig Gibb, Mr. C. Wood, Mr. A. A. Johnston, Colonel C. M. Davidson, Mr. D. Milne Watson, Mr. A. P. Hayman, Mr. R. S. Gardiner, Mr. W. Williams, Mr. H. J. Yates, Mr. Councillor Irwin, Mr. H. M. Thornton, Mr. J. Lister Godlee, Mr. R. G. Shadbolt, Mr. L. W. S. Rostron, Mrs. M. A. Cloudesley Brereton, Mr. F. H. Jones, Colonel H. Oakden Fisher, Sir Hugh Owen, G.C.B., Mr. Alderman J. Craig, Mr. John Miles, Mr. Alderman F. S. Phillips.

To the left of the chair were: Bailie Thomas Paxton (the President-Elect of the Association), Mr. H. E. Jones, Mr. R. J. Neville-Neville, M.P. (the Chairman of the Brentford Gas Company), Bailie J. A. Lindsay, Mr. William King (Liverpool), Colonel G. Gascoyne, Mr. J. Douglas Walker, K.C., Mr. R. Y. Bevan, Mr. H. D. Ellis, Mr. H. J. Waterlow, Mr. Alderman W. Armitage, Mr. Henry Woodall, the Mayor of Darlington, Mr. J. Ferguson Bell, Mr. Alderman Bowes, Mr. H. E. Griffith, Mr. Alderman Squire Deighton, Mr. S. H. Jones, Mr. Alderman Newbold, Mr. A. F. Phillips, Mr. W. Mann, the Mayor of Doncaster, Sig. M. de Jongh, Mr. W. D. Helps, de Heer O. S. Knottnerus, Mr. Alderman W. H. Jessop, Mr. C. E. Dovey, Mr. Alderman C. W. Pinkney, Mr. Jos. Newbold, Mr. J. Waterer.

In the vice-chairs were: Mr. T. Goulden, Mr. H. Rayner, Mr. F. J. Bradfield, Mr. J. T. Croxford, Mr. A. Stokes, Mr. E. R. H. Wingfield, Mr. Alex. Wilson, Mr. W. E. Price, Mr. S. Y. Shoubridge, Mr. A. E. Broadberry, Mr. F. Templar Depree, Mr. W. M'Dowall, Mr. R. Watson.

About 450 were present at the luncheon. It was a truly international gathering; and the spirit of fraternity ran high throughout the enjoyable two hours.

After the excellent lunch,

The loyal toasts were honoured with the heartiest expression.

THE BRITISH COMMERCIAL GAS ASSOCIATION.

The CHAIRMAN said he was honoured by his colleagues, the Directors of the four London Gas Companies, who were their hosts that day, by being asked to propose "Success to the British Commercial Gas Association." This was, from their point of view, a very comprehensive toast, because the Association included not only those who were interested in the manufacture and distribution of gas, but also a very large number of gentlemen who were engaged in the manufacture and the providing of the materials and apparatus necessary for the carrying out of their work as gas suppliers. There was, indeed, a third interested party—the gas consumers, who were not included in the membership; but, inasmuch as the whole effort of the Association was devoted to their interest, special representation was not necessary. At the exhibition, and the congress which was being held in connection with it, there was the evidence of the kind of work which the Association was doing in this direction; and the intimate and close relationship that was established there between the consumer and the Association was, he felt sure, very much to the good. The Association was not at first regarded with the same favour that it now received; and it was to be counted to its credit that the work of the last two years had had the effect of drawing into its ranks many of those who at the outset were not satisfied as to the wisdom of its formation. So far as he had seen, there was now no distinction apparent—at any rate, he was sure there was none between the different classes of members in the whole-hearted effort to promote the success of the exhibition and the industry which it represented. The co-operation to which he had referred had meant the breaking-down of (should he say?) much secretiveness which used to prevail. He remembered the time when the manufacture of gas was not regarded so much as an industry as a mystery, of which the managers of gas-works were the priests. [Laughter.] He himself remembered at least two occasions some years ago on which, in case even of the Company of their late friend Sir George (then Mr.) Livesey, he (Sir Corbet) with others made application for permission to inspect the works, and was kept waiting while a solemn consultation took place among the officers, and was then told that they could not be permitted to see the works without the consent of the Directors. Entrance to a gas-works was then about as difficult as it was now to obtain permission to visit an armament factory. This aspect of their working and of their relations one with another was happily now gone; and the factor of co-operation was dominant, he believed, from end to end of the industry. The previous evening, a gentleman sitting near to him at the banquet said to him: "My undertaking is a subscriber to the funds of the British Commercial Gas Association; but I am not sure that we get our money's worth in return." The idea in his mind was that, the headquarters of the Association being in London, it was therefore for London that the work of the Association was intended, and not for the whole country. In the work of the Association, the good of one tended to the good of all. The success of gas in Glasgow had an action upon the success of it in London; and certainly the success of gas in London reacted throughout the whole country. They offered to their able and indefatigable President most hearty congratulations upon the success which had attended the meeting so far; and he (Sir Corbet) said again that the great success of the exhibition in which they met was a tribute to the idea upon which the Association was founded, and which was expressed in its motto—"All for one, and one for all." He would only add one more word, and that was a word which was given to him by his friend Mr. Bailie Paxton. It was the word "enthusiasm." In whatever they did, if they were to succeed (and this Association was young enough to have troubles in front of it), they must do it with their hearts, and with enthusiasm. With the greatest possible pleasure, he gave them the toast of "The British Commercial Gas Association."

The PRESIDENT (Mr. Edward Allen), in reply, said he had to respond to this toast because he happened for the moment to be President of the Association. He said for the moment, because it was only a matter of minutes before he had to lay down his office, and make place for the very worthy man who was sitting to the left-hand side of the Chairman. If any one individual more than another ought to have replied to this toast, that individual was Mr. Goodenough, whose labours both in the initiation of the Association and during the past two years of its history had made him the most prominent person connected with it. He (the President) desired to express, on behalf of the members of the Association, their gratitude for the very kind way in which the toast had been received. The Association was but young; but at the same time the growth had been so rapid that they felt to be very strong. They had not, however, so much the sense of their own strength as of their great responsibility to the gas industry and to the general public. The industry expected great service from the Association; and, if he was not mistaken, it would receive great service, and greater service as the years rolled on. The Association desired to assist by the work of national publicity. They also desired, and he was sure they were effecting their desire, to educate those responsible for the commercial work of gas undertakings. From what they had heard that day and the previous one from the able papers which had been read, he was sure that every man who had attended the conference would go back to his work better fitted to carry out the important duties that rested upon him as an official or administrator of some great undertaking, or an undertaking, it might be, of smaller dimensions. The members were indebted and grateful to the Chairman and to his colleagues of the London Companies for their kind hospitality. He would not say more on this point, as he understood that the duty of proposing a vote of thanks to them would rest upon another. The previous day he (the President) said that gratitude was a lively sense of favours to come; and he referred, with some amount of unction, to the important function of that day. As he looked round the tables, he was satisfied that their anticipations had been more than realized; and that they were all very much happier than when they came into the room. He thanked the Chairman for the kind way in which he had alluded to their Association; and he assured him and his colleagues of the London Companies that the Association would do its best to fulfil their expectations of it.

THE GAS INDUSTRY OF LONDON.

Alderman F. S. PHILLIPS (Salford) remarked that it was with very real pleasure that he rose to propose the toast of the gas industry of London; and he knew beforehand that in this assembly of his brethren engaged in the gas industry from North, South, East, and West, it would not be a difficult task to induce them to accept the toast with enthusiasm. They had received at the hands of those responsible for the conduct of the gas industry of London, on this occasion of the meeting of the Association in London, the very highest courtesy, kindness, and hospitality. They were indebted to them not only for those qualities which had been shown to them upon the present occasion, but for those qualities which had been shown them upon many previous occasions. They knew how helpful the London Gas Companies had been to those who came from the Provinces occasionally to learn something—whether it was to get advice or experience; and that they were always met with the utmost helpfulness and attention. Although the gas industry was now one hundred years old in London, it was still in the height of its youthfulness and its vigour. He must confess that in the year 1900 he was one of those who had a sort of fear at the back of his mind that gas was passing away and that electricity was coming in. He had had an

opportunity of gaining experience in another place; and he found that he was absolutely wrong, and that gas was simply coming, and not going. As his colleagues and himself were on their way to London by train, they left Salford with the sun shining; when they got out of the town, the grass was green, the air was clean, and it was a beautiful day. They passed along, and got into the Midlands. The weather changed. They had a thick atmosphere, a clouded sky, and what they called November weather. But when they got a few miles further South, they again came into the brilliant sun and clear atmosphere. It occurred to him that the gas industry was greatly responsible for the change that was coming over the districts served by the various undertakings. Their work was not merely the pursuit of an industry, not merely the service of man, but it was the highest form of service that was committed to them; and if they were faithful to their trust, they would see a great change come over England. The gas industry of London, which was the subject of the toast, was in a healthy condition; and he believed it would remain so. He asked those present to join with him in expressing their sense of gratitude for all they had received at the hands of their hosts. He believed they owed the initiation of the British Commercial Gas Association to London; and for all these things, they said most sincerely, "Thank you very much."

Competition—Present and Future Exhibitions.

Mr. Charles Carpenter, D.Sc. (who was received with quite an ovation), replying to the toast on behalf of the London Gas Companies, said he need hardly tell them he was deeply touched by the warmth of the feeling with which those present had responded to the toast which his good friend, Mr. Alderman Phillips, had proposed. That was "The Gas Industry of London." He could not hide from himself that this was a duty that more fittingly and more properly should have fallen on their Chairman, in view of the position which he occupied at the head of that great part of the gas industry which had its home in London. But the Chairman being in the position which he rightly occupied that day, he (Mr. Carpenter) had the honour for this occasion to be his understudy. The gas industry of London was in some respects on a different footing from that which the industry occupied throughout the rest of the United Kingdom. In London they were not in competition with only one electric undertaking, as was the case in the large number of provincial cities and towns; but they were face to face with a great many. He did not know what was the number of competitors in the case of the Gaslight and Coke Company; but, in the case of the South Metropolitan Company, they had nine electric undertakings with whom they were in business contact, and who were in competition for the supply of light, heat, and power. Now this was very much the condition of affairs in which some of the members of the British Commercial Association also found themselves. Let them take, for instance, the manufacturers of gas cookers and fires. Each maker was in competition with other makers; and the result of the competition had been an increase in the keenness with which they carried on their business, and in the energy they put into it. One of the advantages of being associated with the gas supply of London was that they were being continually sharpened up by the keen competition to which they were subjected. There was one interesting feature in the competition, and it was that what one of the undertakings did not know the others did. This, too, was very much the case with the particular members of the Association to whom he had referred. What one maker of gas-fires did not know was perhaps common knowledge to the other makers. But the competition that they carried on was always a straightforward and honourable one. Unfortunately, he could not say the same of the electric competition. He might give an example of the case of one municipal electrical engineer who put a bull's-eye lens in front of a metal filament lamp; and, taking the illuminating power of the beam of light, he calculated this as the amount of the illuminating power of the street-lamps, and so proved, to the satisfaction of his Committee, that he could illuminate the streets by electric current at a cheaper rate than it could be done by gas. [Laughter.] This was an example of the competition that the London companies had to face. But they gave no quarter, for they received none. Mr. Jones (who would follow him) would speak for the Commercial Company; but there was one thing he must say with regard to the Commercial Company, because he thought it was an object lesson that was so well worth the attention of all who were interested in gas supply. The Commercial Gas Company were surrounded by a ring-fence. They could not possibly get a new street in their district unless they did away with one or two others. Yet, despite this, they had been able to gain a large increase in their business, because they had adapted themselves to the requirements of their consumers in other directions. They had now a very remarkable industrial load. He was not sure if one of the means by which they had attained this could be seen in the exhibition. He hoped it could be. But whether it was so or not, the results that could be achieved thereby had been very remarkable. He referred to the industrial burners that had been designed by one of the members of the Company's staff. With regard to the other two companies, they were somewhat more in the public eye at the present moment. There was no gainsaying the fact that they owed this large exhibition very much to the initiative and the work of the Gaslight and Coke Company; and there was no doubt the educational advantage of the exhibition would be, as Mr. Allen had pointed out, very great to the gas industry. Two parties required educating—the one was the supplier of gas, and the other was the user of gas. Unless they could educate both these parties, they could not hope to get the most out of the magnificent industry with which they were associated. The other exhibition to which he must refer was by the South Metropolitan Gas Company; and there they had gone to work in a very much more humble way. They had not endeavoured to teach the gas profession; they had not endeavoured to teach the public as a whole. But they had endeavoured to deal with a section of it—that section which had home life in it. They had endeavoured to show that gas lighting could not only be efficient, but artistic; and that gas heating could not only be efficient but ornamental as well. He might say that their exhibition had the unique honour of being the first to be inspected by Queen Alexandra when Her Majesty paid her recent visit to the Ideal Home Exhibition. [Cheers.] The exhibition had met with the approval of great numbers who had visited it—and there had been great numbers at Olympia, for up to the previous day, upwards of a quarter of a million of people had visited the Ideal Home Exhibition. He thought that perhaps he ought to take the opportunity of explaining, or perhaps apologizing for, the presence of a Company miles away from the district which they supplied with gas. The South Metropolitan Company heard that the electricians had "dished" the gas industry there by getting in first. But they had an opportunity of getting even with them; for they had only taken the precaution of keeping out the Brentford and the Gaslight and Coke Company. [Laughter.] But then, it was not quite an easy matter for the South Metropolitan Company, because the local Electricity Department had a contract for supplying light for the exhibition. But the Company made a contract with the organizers of the exhibition for a stall; and when the time came, and they wanted a supply of gas, the municipal authority did their level-best to keep out the Company. But their presence there was assured. The local authority could not stand up against what he threatened them with—that was the law. [Applause.] That was why they were at the Ideal Home Exhibition. The exhibition had come to stay as one of London's functions, and would probably go on year after year; and he did not think it would be less popular in the future than it was that day. What would be done there in the future was largely a matter for the gas undertakings of London. He would not touch on that question on this occasion; but he would take the opportunity of reminding those present that next year there would be held in London a very great, and in fact he might say a unique, exhibition in the White City. It was the Anglo-American Exhibition—to celebrate the hundred years of peace between the two great English-speaking nations of the world. Now he found that, as usual, the electricians had got the very best hall in the whole of the White City. The question that he should like to ask them that day was this: Was gas going to be represented in that exhibition, which would show a century's progress in art, science, and industry? He wished to ask whether gas was going to be there, or whether electricity was once more going to have it all its own way? ["No, no."] The exhibition they had here was a remarkable testimony to the organizing capacity of that remarkable man on the Gaslight and Coke Company's staff—Mr. Goodenough; but he asked them whether the present exhibition might not be looked upon as a curtain-raiser to a greater and more important spectacle which might be seen next year, and which would be really worthy the magnificent industry with which they were all associated, in which so much capital had been invested, and which, next to the supply of food, was essential to their civilization. He thanked them, on behalf of the London gas industry, for the feeling way the toast had been proposed.

Mr. H. E. Jones (also speaking in response to the toast) said he brought those present a bitter disappointment, because he was only plain Mr. Harry Jones, and not Mr. W. G. Bradshaw, the Chairman of the Commercial Gas Company, who was down to respond, in conjunction with their friend Mr. Carpenter, to this toast. He was an unfortunate cuckoo in the nest of a bird of more brilliant plumage. Mr. Bradshaw was fluent of speech; he (Mr. Jones) was not. Looking at the wall in front of him, he recalled Belshazzar; and he asked them to read the sign on the wall. The sign he saw was "Sweet are the uses of advertisement." Mr. Bezant would tell him that this was not the proper quotation, and that it should be "Sweet are the uses of adversity." [Laughter.] The adversity would come after the Christmas coal bills and oil bills came in. Therefore they would deal that day with the quotation from the point of view of advertising. They must all agree that this great demonstration—this magnificent show—was advertising and demonstrating in the fullest manner all the means by which the community might indulge in the comforts and convenience of gas lighting and heating. He thought it was educational in every sense of the word. Walking along the galleries, he had come to the conclusion that the ordinary agricultural labourer could not reach that hall without knowing a great deal about the comforts and conveniences that gas offered. Although he was not Mr. Bradshaw, he was known to them as an old collaborator in the industry, not in simply one town but in several; and he agreed that they must advertise themselves, but it must be in their own way. He was speaking as a gas manager to the gas managers present; and he said this, and said it very sincerely, that they must be careful to put their commodity at the service of the public at a cheap rate. They might do a great deal by these exhibitions, but they would do a great deal more for the

industry by lowering the price of gas. That would bring more business than any other means of which he could conceive. Mr. Carpenter had alluded to the phenomenal success of the Company which he (Mr. Jones) represented that day—the Commercial. It was perhaps rather appropriate that, in entertaining the British Commercial Gas Association, the old Manager of the Commercial Gas Company should speak. Mr. Carpenter had pointed out the extraordinary way in which, in the Commercial Company's purely industrial district of London—where there were no fashionable residents and no middle-class people at all—the busines had increased; and it was the proud boast of the Engineer of the Company that, in the small area (for it was the smallest gas area in the whole of London), upwards of 90,000 working men had flocked to his standard, and were burning gas. He had also the proud privilege of melting all the coinage of the Mint; and the Royal Mint, he might say, took as much gas as many a middle-sized town. He also supplied with fuel the gold refineries of Messrs. Rothschild. In addition, there had been an interesting development in the use of gas for bending the plates for building ships, pumping out dry docks, and lifting water for the Metropolitan Water Board. The Manager of the Commercial Company was fulfilling, in a variety of ways, tasks quite unknown to the average gas manager. He (Mr. Jones) could not sit down without saying a few words more about the subject of cheap gas. Looking at the wall opposite, the great genius who was represented in one of the pictures hung [Sir George Livesey]—the man who liberated the gas industry from the tyranny of trade unionism, and from the tyranny of ill-founded legislation—used in his younger days to write to the "JOURNAL" over the signature of "Keep the Lead;" and the individual who was now addressing them (this was 45 years ago) used to write over the signature of "Cheap Gas." Between them there was friendly rivalry. From that day to this, he had believed that the true thing for the gas industry was to reduce the price of gas by the exercise of all their ingenuities in manufacturing on economical lines, and so serve the community with a cheap article for use by the means of which the National Gas Exhibition showed such a variety, and which were of value to the community at large.

THE VISITORS.

Mr. R. J. NEVILLE-NEVILLE, M.P. (the Chairman of the Brentford Gas Company), said he was proud to be entrusted with the toast of "The Visitors." He was there representing the fourth Company which had provided the entertainment, and which supplied the whole of the gas by which the luncheon had been cooked, the gas for the whole of the lighting of the exhibition, and the gas for supplying the power for driving the machinery. It gave him very great pleasure indeed as the temporary representative of the Company to offer a hearty welcome to those who had done the London Companies the honour of coming there that day to this entertainment. It also gave him great pleasure as a member of Parliament—where the profit per ton worked out to a very small figure at the present time—[laughter]—to welcome to London what really was a practical representation of one of the great democratic forces which at the present time was doing so much good in every part of the country. In Parliament the gas industry was not largely represented. Indeed, he did not think, though he might be wrong, that there were more than ten men in Parliament at the present time who were in any way connected with the industry. But he did think that those responsible for this great democratic industry must do their best to see that those who were sent to Parliament should have a proper sense of the value of the industry, and a proper sense of the way in which the industry was to be helped forward, because he took it there was no such civilizing force now in existence in this country as that which produced and gave heat and light and comfort in the homes where it was most difficult to provide such things. To the visitors they gave a very hearty welcome.

Colonel H. OAKDEN FISHER, J.P., responded. He remarked that London was known all over the world for its hospitality, especially in connection with the historic building in which they had the privilege and pleasure of meeting the previous day. The London Gas Companies had well maintained their reputation. As representing one of the substantial cities in Wales, he might say that if at any time it was to the interests of the British Commercial Gas Association to visit one of the cities or large towns of the Principality, they would have a welcome hearty and sincere.

THE CHAIRMAN AND HOSTS.

Bailie PAXTON remarked that he had been asked to propose the toast of the health of their Chairman and of those who were associated with him in entertaining them there that day. The representatives of their hosts—Sir Corbet Woodall, Mr. Carpenter, Mr. Jones, and Mr. Neville—were untiring in the good they were trying to do for the gas industry all over the country; and they had indeed achieved a great deal for the industry all over the United Kingdom. Their Chairman was head and front in the gas industry. During the past few years, he (Bailie Paxton) had met at his hands nothing but kindness and consideration, and this was because Sir Corbet believed that he and his colleagues were striving in their own sphere to do their best for the gas industry of the country.

The toast was accompanied by musical honours, and three cheers were given for the Chairman and one for Lady Woodall.

The CHAIRMAN said the kind words in which the toast had been proposed were hardly necessary, because the hosts on this occasion felt that the success of this gathering (which had been evidenced by the cordiality and harmony which had prevailed) was reward amply sufficient. What they desired was to fulfil one of the objects of the Association, and to bring together those who were interested in their industry. "Iron sharpeneth iron; so a man sharpeneth the countenance of his friend." So would they, by being more intimately acquainted one with another, be the better fitted for carrying on the great work in which they were engaged. [Cheers.]

The business sitting of the members was shortly afterwards resumed; and, at the close, the members had tea together.

MASONIC.

In view of the fact that the National Gas Exhibition and the Annual Meeting of the British Commercial Gas Association were both being held at the time of the regular meeting of the Evening Star Lodge (No. 1719)—*i.e.*, the fourth Wednesday in October—a very cordial invitation was extended to the masonic members of the General Committee of the Exhibition and of the Association to attend as guests of the Lodge. There were about a hundred brethren present; and the regular business of the Lodge was carried out—consisting of the passing of five brethren. Afterwards, the W.M. (W. Bro. W. Edgar), on behalf of the Lodge, welcomed the visiting members, and his speech was replied to by W. Bro. R. G. Shadbolt on behalf of the British Commercial Gas Association, and Bro. W. D. Helps for the Exhibition Committee. Subsequently, at the banquet, the toast of "The Visiting Brethren" was responded to by W. Bro. G. H. Beetenson, of Herne Bay, W. Bro. W. Thomson, of Ramsgate, W. Bro. Sig. Marcel de Jongh, of Rome, Bro. Friedrich Lux, of Ludwigshafen, Bro. H. James Yates, of Birmingham, Bro. W. D. Helps, of Leeds, and Bro. de Heer Vander Willigen, of Brussels. In addition to those mentioned, the brethren from abroad included M. B. Schmidt, of Brussels, and Mr. A. W. Edwards, of Copenhagen.

REPRESENTATIVES OF GAS INTERESTS ABROAD

Present at the Conferences or Other Functions.

The conferences and entertainments of the British Commercial Gas Association were graced by the presence of a large number of visitors representing various gas interests from the Continent and even much farther afield. Below is a list of the foreign guests, and included in it are the names of some gentlemen residing in this country who are associated with work of other countries.

Barre, G., France
Bertin, Lucien, France
Bolsius, P., Holland
Bowder, Aug. (Representative of New Brunswick)
Busine, L., Belgium
Busine, R., Belgium
Coudelon, R., France
Coune, G., Belgium
Cros, L. France
Coward, W., Australia
De Brouwer, A.
De Brouwer, J., Belgium
De Jongh, Marcel, Italy
De le Paulle, H., Belgium
De le Porte, U.K., André, Holland
Degand, J., Belgium
Docker, A., Australia
Drochner, B. T., Holland
Edwards, A. W., Denmark
Engel, Carel, Holland
Franken, J. H., Belgium
Fogg, Oscar H., America
Gautier, Gaston, France
Genotte, E., Belgium
Hayman, A. F. P., Belgium
Heeley, G., France
Homulle, H. J., Holland
Howard, John (Agent-General Nova Scotia)
Kampe, H., Germany
Kenens, S., Holland
Knottnerus, O. S., Holland
Lempelius, Karl, Germany
Lenoir, L., Belgium
Lux, F., Germany
M'Bride, Hon. Peter (Agent-General Victoria)
Mackay, J. W., Shanghai
Mackenzie, J., Australia
Mattenklott, Hans, Germany
Midridelatoste, W. J. C., Amsterdam
Miura, Y., Japan
Ochtman, J. A. A., Holland
Riedel, J. Th., Holland
Sauter, L., Holland
Schmidt, B., Belgium
Schouten, J. P. R., Holland
Scandrett, W. B., New Zealand
Turner, J. H. (Agent-General British Columbia)
Van de Polder, P. L., Holland
Van Heede, E., Belgium
Van Rossum du Chattel, J., Holland
Vander Willigen, T. A., Belgium
Vautier, Georges, France
Villiers, Henry, France
White, T. G. (Representing New South Wales)
Wilson, G., Holland

THE NATIONAL GAS EXHIBITION.

INTERNATIONAL EXHIBITIONS HALLS, SHEPHERD'S BUSH.

Organized by the Leading Gas Companies and Corporation Gas Committees of the United Kingdom and the Society of British Gas Industries.

President - SIR CORBET WOODALL, D.Sc., M.Inst.C.E.

NOTES FROM THE EXHIBITION.

OPPORTUNITIES—The last few days of the Exhibition.

An estimate of last Saturday's attendance at the exhibition was about 18,000. At one time during the evening, the entering visitors were asked to wait a short time until—big as the place is—a few of those already in the show had cleared out. One of the largest organized visits on Saturday was from Nuneaton. It included Press men; and Mr. George Helps was kept very busy during the day explaining to sections of the party the features of the exhibition.

Next Saturday night the doors of the exhibition will finally close; and another opportunity of seeing such an extensive demonstrative display of the applications of gas will probably not recur for years.

The thick mists and low temperature of last week had their uses. The inquiries at the exhibition were many regarding gas-fires. One gas man was heard to ask another if he knew where he could get some additional fitters. The reply was: "I should like to get a few more myself."

Meeting gas men last week, we had here and there information as to inquiries at their local offices for new appliances, which inquiries were traceable to the exhibition. In one country supply area in which quite a number of admission tickets were distributed, there have, we are told, been several orders for domestic appliances in which there has not been any particularly notable business done before; and these were the result of what had been seen at the exhibition. Our informant said this was the thin end of the wedge; and to get in the thin end of the wedge of new business was worth something in prosecuting developing work. We agree. The beginning is usually the hardest part.

There is one gas engineer in the country who seems to have taken to the exhibition representatives of his fellow-townsmen who have influence in most walks of life. His last party was made up of architects and builders, and the number was about 26. To-day the same engineer will be up again with more townsmen. There are only a few more days for this sort of thing. After next Saturday, it will be too late to follow this excellent example.

That engineer was not the President of the Institution of Gas Engineers (Mr. Edward Allen, M.Inst.C.E.). But the last party he was seen with at the exhibition was the Lighting Committee of the Liverpool Corporation. No doubt the members of that body saw in the demonstration the justification for giving the gas consumers as many heat units as possible through gas for a given price. If so, the Gas Company's Bill next session will, at any rate in this particular, receive their unqualified approval.

Thursday was Imperial and International Day at the exhibition. It was the day of the sulphate of ammonia international conference; and there were several gas men from abroad still in evidence who had been guests of the British Commercial Gas Association. There were quite a large number at the dinner in the evening given in honour of the delegates from across the seas. The speakers to the toasts on that occasion included the names of guests who represented Australia, France, Germany, Belgium, Holland, and Italy. A full list of foreign visitors during the week appears in another column.

On the occasion of that dinner, Mr. F. W. Goodenough made an interesting announcement as to the attendances at the exhibition. They have varied per day from nearly 9000 to upwards of 16,000—the higher figures having been secured as the exhibition has progressed. The older the exhibition gets, the greater becomes its popularity. For instance, last Wednesday the attendance was 30 per cent. more than on the previous Wednesday, and that day registered a 66 per cent. increase upon the Wednesday of the week before.

It may well be that next year the gas industry will not be unrepresented at Shepherd's Bush, if Mr. Charles Carpenter's hope comes true that, at the Anglo-American Exhibition, to celebrate the hundred years' peace between the two English-speaking nations, electricity will not be allowed to have all its own way. But Mr. Carpenter dreams of a gas spectacle then exceeding that of the present display. It may be possible; but is it probable?

"Dagonet" in "The Referee:" "What is the difference between the Gas Exhibition at Shepherd's Bush and the Gas Exhibition at Swindon? One deals with lighting the land and the other with looting it." It depends on our political convictions whether we agree *in toto* with G. R. S.

The walls of the reception room at the exhibition are relieved and ornamented by a number of pictures. There is one—an oil painting of the Beckton works from the river, and as they appeared some time ago—from the brush of Mr. W. L. Wyllie, R.A. The rest, and there are a good number of them, are all the work of Mr. B. A. Lewis, the Manager and Secretary of the Carmarthen Gas Company. After this display, no one will be able to say that the management of a gas-works and artistic ability are not companionable, nor that the gift of transmitting to canvas Nature's own pictures must be killed by daily association with the drab components and surroundings of a gas-works.

The press cuttings in the newspaper room and outside the administrative offices show how universal has been the attraction of the exhibition.

Yesterday there was, and to-day and to-morrow there will be, shown, at the King's Hall Picture Palace, Uxbridge Road, adjacent to the exhibition, the cinematograph film illustrating the mining of coal and the manufacture and applications of gas, which has been prepared for the British Commercial Gas Association, through the kind offices of the Newcastle-upon-Tyne and Gateshead Gas Company. This will be worth seeing.

Mr. E. Lovett, who described the origin and history of artificial lighting and heating on Wednesday, has a collection of primitive lighting and heating implements which would cover 5000 square feet of space. It is understood that he is prepared to present his collection—which has been got together as a hobby—to the nation if proper housing room can be found for it. We are inclined to agree that the collection should be purchased on behalf of the nation. Mr. Lovett, who fears that, if the collection is not kept for the nation, it will have to be dispersed, has, curiously enough, very little carefully prepared information with regard to it. It all exists in rough notes and in his head.

The Voelker Company are now in occupation of the mantle-making stand, and will continue to demonstrate there until the close of the exhibition.

Talking to a gentleman the other day who uses electricity for lighting, reference was made to the Gas Exhibition; and he remarked that he supposed the paint and decorations would be in a filthy condition by the end of the month with so much gas being burned. We laughed tradition in the face. That gentleman has been to the exhibition; and he will not be guilty of again talking nonsense on that point. If gas as now consumed caused the wholesale destruction of paint as is supposed by people of incomplete knowledge, then paint makers ought to support as many gas exhibitions as it is possible to float. But it is not the case. Yet we find that Messrs. John E. Williams and Co., of Manchester, and Messrs. Donald Macpherson and Co., Limited, of the same city, among the firms in other lines of business who have given financial support to the National Gas Exhibition.

IMPERIAL AND INTERNATIONAL DAY.

Last Thursday, a dinner was given at the exhibition by the Executive Committee, in honour of the delegates from Foreign and Colonial Gas Undertakings and Institutions. The PRESIDENT (Sir Corbet Woodall, D.Sc.) was in the chair; and there were altogether 51 foreign and colonial delegates present.

The PRESIDENT, after the Loyal Toasts, proposed "The Colonial Representatives," and, referring first of all to his position in the chair, said he felt inclined to congratulate his British colleagues upon the fact that, so far as he was aware, this was the last occasion for a long time that he would have to inflict himself upon them. But if he had to choose an occasion when he would be most sorry to be absent, it would be from the gathering that evening, when they had as guests gentlemen who had come very long distances—close friends many of them, but whom the distances which they lived apart prevented from frequent meeting. On behalf of the Committee of the Congress and Exhibition, he extended to the visitors a most hearty welcome, and particularly thanked them for the kindly interest they had shown in the effort of the gas industry. The exhibition would, he believed, amply repay the amount of time and attention which their visitors were able to give to it; and he would be sorry if it were considered that the illustrations in the exhibition of what had been accomplished in the matter of the uses of gas were its chief recommendation. The gas industry felt not only that it was able to show in the exhibition what had been done, but also that it would stimulate everybody to what lay before them. He believed the full potentialities of gas were far from realized yet, and that they would see in the near future developments much greater than had attended the efforts in the past. The developments in recent years of the value of gas for lighting purposes had been so great as to equal, if not exceed, the wonderful developments of electricity; but in the region of heating and the use of gas as a fuel, he believed there was pending in the immediate future such a development as would make what had been done so far appear feeble and small. He concluded with a tribute to the loyalty of the Colonies to the Mother Country, which had shown itself on more than one occasion when the Empire was verging towards what might be termed national danger, and regretted that the Hon. Mr. Peter M'Bride, the Agent-General for Victoria, was unable to be present to respond to the toast.

Mr. T. G. WHITE (Secretary of the Department of the Agent-General for New South Wales in London), responding, said that as a commercial man from the Colonies he was certain a society similar to the British Commercial Gas Asscciation would be heartily welcomed in Australia. The principle of co-operation embodied in it should commend itself very much there. In Australia, a certain amount of support had been rendered to the Association. He understood that Melbourne had made a contribution on the basis of 2s. 6d. per million cubic feet of gas sold, and also that Newcastle (N.S.W.) had recently come in with a contribution. He thanked the President for his expression of goodwill, and remarked that in Australia they would like to receive regularly the publications of the Association. He understood that those who subscribed received them; but, if they could be furnished to the offices of the Agents-General, it would assist in making the Association better known.

The PRESIDENT said that, in making his previous speech, his faulty memory was responsible for his omitting to mention one or two other matters which he had intended to do. A point he wanted to make was that, while the Colonies were to a large extent the paradise of working men, they gave us reason to pause a little before entrusting the control of affairs absolutely to a Labour Parliament or a Labour Administration. Friends from New South Wales would remember the case that took place a little while ago with regard to the gas supply of the great city of Sydney. There an effort was made to reform the administration of the gas undertaking; and the first step was to cut down the dividends of the Company (which had been paid for many years and earned very honestly) in a most drastic manner. He was glad to know that the good sense of the people of the country generally protested against it, and that eventually an arrangement was made that had been entirely to the satisfaction of all parties. The effort, no doubt, to put the companies under the same control that obtained in this country was a very legitimate one, but the methods pursued were a little embarrassing for a time.

Mr. W. DOIG GIBB, in proposing "International Friendship," said he looked forward to such gatherings as this as helping the cause of the peace of the world, and bringing forward the time when "wars and rumours of wars" would be delegated to the historical records. In industrial matters, and particularly in the case of the gas industry, he believed this period had already been reached; and if anyone doubted it, he had only to look to the records of the Institution of Gas Engineers and its many foreign visits to be convinced upon the matter. As a matter of fact, international friendship was not a thing of the present day, for 111 years ago Jefferson, in his Inaugural Address to the United States Senate, stated that his policy was "Peace, commerce, and loving friendship with all nations."

M. G. VAUTIER, replying on behalf of the Société Technique de l'Industrie du Gaz en France, conveyed the greetings of the French gas industry to his British *confrères*, and congratulated the Executive Committee on the remarkable exhibition which they had promoted. The exhibition proved that the gas industry still had all the characteristics of youth and energy, and demonstrated that there remained a vast field for the exercise of activity and science in it. Such friendship as had been manifested during their visit would do much to strengthen the ties of esteem and friendship between English and French gas engineers.

Herr KARL LEMPELIUS replied, in similar terms, on behalf of the Deutscher Verein von Gas- und Wasserfachmännern. One of the best ways to bring nations closer together was, he said, through their industries; and English gas engineers had by their splendid achievements done much good work in the cause of peace. The visit of the Continental gas engineers to the exhibition was the sort of thing best calculated to show the true meaning of English character. He hoped, when the occasion to submit Continental work to the consideration of British gas engineers arrived, this work would be given careful consideration; and it was his wish next year, when the Munich Gas Exhibition was held, to see a large party of English gas engineers. He need hardly say that they would receive the heartiest of welcomes. He could assert that questions of politics had never at any time affected the relations of gas engineers of the various countries; for they all had one aim, and that was to be of use to mankind by extending the advantages of the branch of industry which they represented.

M. L. BUSINE (the Vice-President of the Association des Gaziers Belges), in proposing "The National Gas Congress and Exhibition," said the exhibition showed admirable organization, and demonstrated to the full the wonderful resources of the gas industry in Great Britain. Foreign visitors also admired the practical means displayed by British gas engineers in furthering the progress of the industry; and though on the Continent and in Great Britain the industry had had the advantage of the work of men like Lord Dundonald, Lebon, and Minckelers, their labours would never have borne fruit if the commercial side of the industry had not been promoted and fostered by the present generation, the results of which were fully emphasized in the exhibition. He would carry with him a never-to-be-forgotten recollection of the sympathy and welcome they had received at the hands of their British *confrères*.

Mr. EDWARD ALLEN, speaking in reply to the toast, said one of the happiest features of the exhibition was the harmonious working between the gas undertakings and the makers of gas apparatus and gas appliances; for it had enabled people to come to the exhibition with the knowledge that they were not going to be asked to buy. He was glad Mr. Goodenough was going to reply to the toast also, because Mr. Goodenough was *the* representative of this great exhibition. As President of the Institution of Gas Engineers, he (Mr. Allen) would content himself with expressing his pleasure at seeing so many friends in the gas industry from France, Germany, Belgium, and other places.

Mr. F. W. GOODENOUGH (the Chairman of the Executive Committee) said the exhibition had still a week to run; but it might be well to examine how far ambitions had been justified by achievement. What had been attempted? They had set themselves the task of making an exposition of the modern developments of the industry and of its possibilities in the direction of serving the public. They had kept uppermost in their minds the broad principle of public service, and had endeavoured to avoid the spirit of commercialism. The aim was to demonstrate the capacity of gas as an agent in solving sociological, industrial, domestic, and public health problems. This broad object had only been made possible by the spirit of service shown by makers of plant and apparatus in co-operation for the good of the industry, instead of entering into competition for self-advantage. All those connected with the exhibition had recognized that in this, as in other things, immediate self-sacrifice would result in ultimate general gain. They had also endeavoured to study the comfort and convenience of the public; and he thought they had made a commendable precedent by securing an absence of that disagreeable accompaniment of touting which had disfigured so many other exhibitions. They had also considered the public by giving plenty of breathing-space, and providing places of rest without irritating demand for extra payments. These had been the aims. What had been achieved? They had succeeded in interesting that special public of eminent scientists, educationalists, architects, medical men, and social workers, who, with no axe to grind, had willingly given their valuable time to attend the conferences, and to show in what way gas could be applied in the solution of the problems he had mentioned. The thinking section of the general public had had their interest stimulated. It was not sought to attract the casual public, whose only desire was to pass an agreeable hour or two. The visitors, who had numbered from 8600 to 18,200 per day, had been in search of information. Every day one might see men distinguished in varied spheres quietly examining exhibits of special interest to them. Even Mr. John Burns had felt that he could learn something of public value; and he had expressed himself as much impressed by what could be achieved by the application of gas to public institutions. And Mr. Burns having set the fashion, many people interested in local government had not only visited the exhibition and made inquiry, but had in several instances followed this up by large orders. This immediate result was not the thing which had been primarily in view. They had set out to educate; and if the process had been more rapid than was anticipated, it was a tribute rather than a criticism. The ultimate results of the congress and exhibition were difficult even faintly to foreshadow in the direction of the lighting, heating, and ventilation

of the home, the school, and the factory; while the industry itself had benefited in education as to the possibilities of its own products. The congress had brought the social-reform aspect of gas into the limelight. It was only comparatively recently that the public had realized the health and economic values of the use of gas. Indeed, he would go so far as to apply this remark to the gas industry itself. They had learned how to study the works of scientists, and to apply their science to the manufactures; and their experience had taught them that they must keep abreast of modern principles of health, economy, education, and art. The industry generally appreciated to-day that it was not enough to dump down any sort of article upon the consumer, and that modern business was more and more becoming social reform across the counter. The aim to-day was first to satisfy the demands of the consumer, and, secondly, to advance still further the progressive ideas which stimulated these demands. In other words, because social progress had become a factor in the industry, the industry had become a factor in social progress.

Mr. D. Milne Watson, proposing "Our Guests," after making short speeches of welcome in French and German, said he felt convinced that this international gathering would help them forward to those good days when peace would reign over the whole world. Englishmen could never forget the great debt of gratitude they owed to their Continental compatriots like Lebon, Bunsen, and Welsbach, without whom he did not know where the gas industry would be to-day. All he could say to the visitors was that he hoped they would come again, when he could promise them as sincere and as warm a welcome as they had had that evening.

De Heer P. Bolsius (Past-President of the Vereeniging van Gasfabrikanten in Nederland), in reply, referred to the efforts which had been made to render the visit of the Continental gas engineers as pleasant as possible. They had been shown the sights of London, they had been present at the general proceedings of the meeting of the British Commercial Gas Association, and they had enjoyed the hospitality of the great Gas Companies of the Metropolis. Then they had admired the splendid exhibition; and now they had been entertained by the President, Vice-President, and members of the Committee. It was only a duty to thank all those who had taken part in their entertainment, and to reciprocate the good feelings which had been expressed.

Signor Marcel de Jongh (member of the Associazione Italiana Industrie Gas e Acqua) also replied to the toast in somewhat similar terms.

Mr. W. D. Helps proposed the final toast of "The President." Sir Corbet Woodall, he said, had during the past twelve months been by no means a figurehead; and looking back upon his past life, it was difficult to say in which matter he had been most successful. Probably everyone would agree, however, that it was the manner in which he had strengthened the position in every direction of the Gaslight and Coke Company. He had fallen into the breach at the psychological moment, and had brought the Company back to a very successful issue indeed. He had even not found it beneath him to give time and attention to such small matters as the Society of British Gas Industries. All those who knew him were aware of the fact that he had not been boomed into his present position, but that he had gained it by his force, geniality, personality, and power of administration.

De Heer O. S. Knottnerus seconded, and the toast was drunk with the company singing "For He's a Jolly Good Fellow."

The President, in reply, said he found it very hard to acknowledge the toast; but he was quite prepared to accept any tribute that might be paid to him as one willing to work for the industry. He wished he could speak for it as he felt. Mr. Milne Watson, the General Manager of the Gaslight and Coke Company, had, however, probably made up for his deficiency in this latter respect. He hoped that in the future the only competition there would be between different countries would be the competition of who could best fulfil the duties they had to perform in the various industries.

CONFERENCE ON THE ECONOMICS OF THE HOME.

Another of the conferences arranged in connection with the exhibition was held last Friday and Saturday, when the subject dealt with was the economics of the home. Four papers were submitted. On Friday, the Baroness D'Anethan was in the chair, and in opening the proceedings referred to her life in Japan, and the extreme simplicity of the cooking arrangements there.

FUEL AND LIGHT IN THE WORKING MAN'S BUDGET.

Mrs. Margaret M'Killop, M.A., read the first paper, in which she dealt in a well-considered manner with the important items of fuel and light in the working man's budget. She remarked that in the town budgets (which are the easiest to obtain) gas is replacing oil to a greatly increasing extent every year. It is a noticeable fact in the Board of Trade returns that oil is cheaper in London than anywhere else, except a very few large towns, such as Birkenhead and Birmingham. The north country towns, as a rule, seem to be very enterprising in their widespread installation of gas in all sizes of houses; and their cookers are introduced almost in every house where there are gas-burners. Oil is dearer there, possibly because there is less demand for it. In Liverpool, however, oil is only very slightly dearer than in London; and there the budgets of casual labourers, mostly in old houses near the docks, show that oil is much more common than gas for lighting. Only seven budgets out of forty show any gas used. In fifteen budgets in Edinburgh, selected by investigators for studies in diet, eight only used gas; and in this city it was not by an automatic meter, but was paid for by the quarter, as was also the rent. The cost was about 3d. per week, and probably was for lighting only. Some companies do not supply a gas-cooker unless a minimum of three lights is first installed. It would be a great boon if the companies could supply adjustable lights; so that the height can be varied a little for different purposes, if there is only one in the room. Northern towns, such as Blackburn, Burnley, Crewe, and Carlisle, instal large and increasing numbers of gas-cookers, including what are called "breakfast cookers"—*i.e.*, grill without oven. In Huddersfield, it is said there are gas-heated coppers in the small houses.

Nothing, said the author, could be a greater boon to the housewife in a tenement or flat than a continuous supply of hot water, common to the whole building, such as exists in a few cases. As a first step, would it not be possible, she asks, to put up some sort of heating apparatus in a common washhouse, as these are now quite usual? Some sort of gas apparatus could probably be worked there cheaply on a large scale. General statistics, remarked Mrs. M'Killop, as to the proportion of the whole budget taken up by fuel and light are misleading, as they are difficult to work out, as well as subject to variations. Generally, when wages are between 20s. and 30s., the amount spent for fuel and light varies between 1s. 7d. and 2s. 2d. per week. It is apparently a little higher in Edinburgh, where the average was 2s. 2d. per week on an average weekly wage of 22s. 6d., though the gas was cheaper, being paid for quarterly. This is probably due to the severe climate. The amount does not increase very quickly with increase of wage. Up to a 40s. wage, it does not seem to get beyond 2s. 6d; but that is when the 40s. is not very steady.

The paper concluded with the following summary: In talking of working men, one must distinguish between the artizan with 35s. or 40s. a week, who can afford some little comfort, and the labourer with 20s. to 25s. a week, who gets but bare necessaries, supposing them both to be married men. The former will be able to have a five-roomed house with a parlour and two or three bedrooms (unless he has to live in London, or a congested town where rents are high); and he will be able to spend more on light and fuel. He will spend more on cooking by gas; and he may even consider a gas-fire possible. The labourer will have to live in three rooms (excepting in some Midland and Southern towns, where rent is cheap). The coal-fire in the living room will do most of the cooking except in summer, and he will have but few lights. The fuel for cooking and for warming will be limited, so will the supply of hot water for cleansing and washing purposes. The best way to help his wife at present seems to be to provide common washhouses with some modern form of heating apparatus for water.

At the end of her paper, Mrs. M'Killop asked whether it was not possible for gas companies to initiate or develop new housing schemes, which would be the means of extending to the working classes the advantages of using gas as a fuel and light.

The Baroness D'Anethan proposed a vote of thanks to Mrs. M'Killop for her paper.

Mrs. J. A. Hobson seconded, and in doing so emphasized the importance of good lighting in working-class houses for a family to live and work by. She had often been astonished on going into houses to find the children doing home-lessons in a light which must have necessitated a very severe eye-strain. She once remembered an eminent optician saying that ten minutes' work in an imperfect light did more harm, from the point of view of making patients for his profession, than three or four hours' work with a properly adjusted light; and she hoped the result of this discussion would be to emphasize this important matter.

Lady Yoxall said she also desired to emphasize the necessity for the right kind of light and the right position for it. She regretted that the very class of people to whom the paper was more specially directed was the class which unfortunately was not able to be present at the meeting—namely, the artisans' and labourers' wives. It was fortunate, however, that at the present time young children were being trained in the value of gas in the elementary and secondary schools. Children were also being trained to cook; and there was objection in some quarters to this, on the ground that in many homes there was no gas-cooker, and therefore it was useless to teach children to cook by gas. She did not agree with this, because, as the result of a certain amount of district visiting, she found that gas-cookers were installed in a very large number of poor people's houses; and whenever she

found one was not installed, she did her best to urge the mother of the family to do so. Mrs. M'Killop had referred to the use of gas-boilers in Huddersfield. In Huddersfield a great many things were done that people up and down the country ought to be only too glad to copy; and the use of the gas-boiler was another instance of the way in which Huddersfield set a good example. Probably the reason why the gas-fire was not used more generally in the artisan's parlour was that so many of the labouring classes belonged to a coal club, so that they had a certain amount of coal per week which they felt bound to use. However, the work in the house seemed to be getting more and more almost every day; and therefore it was essential that labour-saving appliances of every description should be employed whenever possible. Certainly, the use of a gas-stove in this connection should commend itself to the thoughtful housekeeper, whether her home was a large or a small one—especially as the old prejudice of the gas-fire drying the air of a room had been done away with. The use of radiators for heating halls and corridors should also be encouraged. It was essential in all houses that there should be a plentiful supply of hot water; and she wondered if it were possible for the gas companies to make some arrangement for attaching a boiler to a gas-fire for this purpose. If such an arrangement were the only outcome of the very excellent gas exhibition, a great deal would have been done.

Mr. F. W. Goodenough said there were one or two points in the paper which he would like to touch upon briefly. First, he would like to ask Mrs. M'Killop whether the figures with regard to Liverpool were recent or related to some years ago.

Mrs. M'Killop replied that they were fairly recent.

Mr. Goodenough said then he would have to draw the attention of his friend Mr. Edward Allen, who was responsible for the gas supply of Liverpool, to the figures. With regard to the use of fuel in the working man's home, Mrs. M'Killop would rather lead one to imagine that the only alternatives were gas or coal. But there was another very valuable alternative from more points of view than one, and that was the use of coke, mixed with a small proportion of coal to enable it to kindle more easily. This led to great economy, and incidentally reduced the smoke nuisance; and a large number of gas companies were now meeting the requirements of the working classes in this direction by selling coke in 28-lb. bags for 4d. or 4½d., which was a great advantage to the poor people, because, among other things, they were guaranteed full weight, which was not always the case when buying coal in the street. He did not wish to render himself liable to actions for libel, so he would not make his statement more specific than this. He believed there was a possibility of coke-heated stoves for the production of hot water as well as heat coming within the reach of the working classes before very long. The production of a cheap hot-water apparatus and fire combined heated by coke was now under consideration; and for the working man with an income which was not very great it was essentially this class of fuel which would be of great advantage to him. The idea of common washing-houses with gas for fuel was not a new one; and there were in his district a great number of cases where a geyser was fitted with a slot-meter, so that different families in tenements could have facilities for hot water for baths and washing purposes generally. He did not know whether the fact that gas-heated coppers were so extensively used in Huddersfield was due to there being only one landlord there. He believed he was right in saying that Sir John Ramsden owned every house in Huddersfield except one, which he had never been able to get hold of; and he was not quite sure that this had not something to do with the fact that arrangements were made in these houses for the benefit of the working classes. Mrs. M'Killop's suggestion that gas companies should go in for house-building schemes, in order to develop the use of gas by the working classes, he was afraid their parliamentary powers would not permit of. Nevertheless, it was not inconceivable that gas directors might interest themselves in such schemes. He agreed with Lady Yoxall that it would have been better if more working-class people had been present at the meeting. It was a most difficult thing to get at them; but much good work was now being done in the schools. His Company tried to help by giving away with every cooker that was fitted with a slot-meter a book of recipes for simple cookery, and also instructions for the economical use of the stove. He also endorsed Lady Yoxall in her impression that gas-cookers were very commonly fitted in poor-class houses, because in London alone in the district of one Company there were 750,000 cookers—*i.e.*, practically in every household that could be called a home at all.

The vote of thanks to Mrs. M'Killop was carried.

Mrs. M. A. Cloudesley Brereton read a paper on

DOMESTIC SERVICE AS A CAREER FOR EDUCATED WOMEN.

Before proceeding to the particular matter for debate, the author thought it would be well to look somewhat closely into our ideals of English home life past and present, and, if possible, attempt to forecast the future. She said she wanted to consider —quoting a phrase used by a public speaker in this connection a few months ago—"whether domestic service in the next generation shall not be considered as honourable and as desirable as the civil service." Assuming for the moment that the answer was going to be in the affirmative, the next thing to be considered would be the scope in an individual home or in an institution which purely domestic work as a paid profession offered to the educated woman; what her special education and training should be for her profession; what were the chances that it would prepare her for marriage and for a home of her own as compared with other wage-earning professions; what her status should be in the home of her employer, and what it ought to be in the community of wage-earning women; how an immediate step could be made towards providing in such work some scope for the large body of daughters of professional and business men who are not too well blessed with this world's goods, and whose chief talents lie in home-keeping and in house-keeping; and, lastly, to look forward, so that we may provide something more in the direction of definite and recognized preparation in a future generation, through the various courses now provided in girls' schools and colleges, for the training of all properly educated girls in the elements of practical domestic economy.

Having dealt with domestic work and the education and training necessary for the profession of house-keeping, Mrs. Cloudesley Brereton passed on to consider what was the status of the domestic worker. This she characterized as perhaps the most crucial point in the consideration of the problem: "What is to be the status of women who take up domestic work as a paid profession?" She thought this rested largely, even under the existing rather anomalous position of affairs, with the women themselves. The well-born, well-bred, and well-educated woman, especially if she had been through a big public school and mixed with all types of girls, would "raise any profession to her own level, and not sink to the status generally assigned to the work which she undertakes." Speaking further on this subject, the author said: "I, for one, always feel very sincerely that, provided everyone in my house does the work assigned to her to the best of her knowledge and ability, provided she brings knowledge and training, her valuable health and strength, and her whole-hearted interest in and for the family to bear upon her work, there is no difference in dignity, even if there is a difference in degree, between my work for my children in earning my share towards the financial upkeep of the house and in governing the broader policy of household administration and expenditure, and that of my experienced cook without whose practice all my theory would be in vain, and the intelligent housemaid without whose co-operation all my sanitary ideas about drains and sinks would be of no avail."

Among the subjects next dealt with was that of unsuitable domestic architecture, if other people than "strong galley-slaves, chained down by the force of circumstances," were to do the domestic work in town and city houses. The author claimed that women should have a voice in house planning. She appealed to architects to advise builders of modern houses, where the ultimate desires of the tenants are unknown, merely to finish-off neatly with the cheapest possible cement the fireplaces in the sitting-rooms and bedrooms and the recess for the cooker in the kitchen, and leave the incoming housewife some scope for suggestion. If a better type of servant was to be looked for in the immediate future, the gas-fire, gas-cooker, and gas water-heater would, she was sure, play a very important part in the solution of the architectural difficulty.

After the domestic architectural problem, Mrs. Cloudesley Brereton thought she should put among stumbling-blocks to be avoided the undesirability of middle-aged gentlewomen attempting to take up paid domestic work for no other reason than that they find themselves economically stranded, and without training for any recognized profession. Such a woman was, she said, totally unfit, if from the physical point of view only, to seriously undertake muscular household work. There were other more subtle, but nevertheless real, difficulties in the case of the middle-aged woman of gentle birth. She usually became very low-spirited and depressed when the novelty of receiving her first wages wore off, and the everlasting routine of housework began in earnest. "The successful lady who takes up household work must begin young, and must have the courage, health, and determination of the true pioneer."

In bringing her long paper to a close, the author said: "Mistresses who are contemplating the trial of educated women, of whatever class—and the day of the educated woman is coming—must entirely change their attitude towards servants and service before they can claim the devotion of mind as well as body which the educated woman who begins young and has her heart in her work can and does undoubtedly give. The work requires, on the part of the worker, youth, training, courage, imagination; on the part of the mistress, a 'revaluation of values' in her domestic economy, and a sincere and sane endeavour to reduce the number of the service staff, to raise the wages offered, and to avail herself of all the procurable modern substitutes for the heavy, dirty, labour-making household appliances which have driven the old servant class out of our homes already, and which will prevent the new and educated type from entering them. Above all, we have to make up our minds that domestic work is work worthy of the best brains, and of the best and most healthy bodies—work worthy of our cleverest daughters, and not work to be relegated to the stupidest ones in any class; and then we shall not only settle the difficult problem of the status of the worker, but we shall be on the high road towards bringing the work, by the aid of labour-saving devices, within the physical capacity of the woman who boasts as much brains as brawn."

The paper gave rise to an animated discussion, in which, of course, the advantages of the more extended use of gas for all purposes as an inducement to this new class of domestic servant were referred to.

Lady Yoxall presided on Saturday. Opening the proceedings,

she referred to the fact that some 25 or 30 years ago she had the pleasure of attending a gas exhibition in the North of England, and also of demonstrating the use of a gas-stove. When she remembered that the whole exhibition was about as large as the lecture-hall at the present gas exhibition, it would be realized how enormous had been the strides made in the interval. Since then she had had the opportunity of testifying, from experience in her own home, to the great advantage of gas cooking over the ordinary coal-range.

Mr. F. W. GOODENOUGH then read a paper on

COAL GAS AS A FUEL FOR DOMESTIC ECONOMY.

In the course of the paper (which was based on the series of Cantor Lectures delivered by the author before the Royal Society of Arts last March, and fully reported in the "JOURNAL" at the time), Mr. Goodenough referred to the cost of fog, and said, the advantages of smokeless over smoky fuel being obvious from the point of view of public health and economy, there naturally arose the question of what were the practicable and desirable alternatives to smoky fuel for domestic purposes. His answer was coal gas, with the assistance of coke in certain conditions and circumstances. As a domestic fuel, however, coal gas had a much wider field of usefulness than coke. The question, in his opinion, came down to this: To what extent can coal gas at ordinary town prices be adopted in place of smoky fuel in the home, with advantage to health, comfort, convenience, and economy? On this occasion he could only deal with the question of gas as a fuel for the heating of the home. He then proceeded to consider the comfort and convenience of gaseous fuel, and the economic and hygienic aspects. Some remarks on the modern fire followed, and then the question of "Do gas-fires really dry the air?" was taken up.

Afterwards Mr. Goodenough turned to the subject of cooking. He remarked that the problem of the fuel to be used in the household is one that has a somewhat varying answer, according to the class and circumstances of the home under consideration. But, so far as cooking is concerned, the answer is the same for every class of house—from the artisan's tenement to the royal palace—namely, that gas is the ideal kitchen fuel, because of its cleanliness, its reliability, its capability of supplying simultaneously the varying degrees and forms of heat required for the different processes of cooking, and its being constantly ready for service without making any dirty, wearying work for its users. The problem only varies in its answer when it comes to the question of whether gas can be used for cooking with economy as well as advantage all the year round, or whether it is only to be used when other circumstances do not require that the kitchen fire shall be lighted. In the case of the poorest of the poor—by which I mean the poorest of the poor who have homes of their own and food to cook therein—it is obvious that, when they need a fire for warmth, they must use that fire also for cooking; and the cooking is mainly done in the saucepan or the frying-pan upon an ordinary open sitting-room fire, not a kitchen stove at all. Here, then, is a clear field for a good domestic smokeless solid fuel; and the success of the plan of selling coke in 28-lb. paper bags to the poor, and to those whose storage is limited, is full of promise for the future. But in the case of the great majority of households, it would be perfectly feasible and economical for gas to be used for cooking all the year round, if only the architects and builders and landlords would wake up to the fact that gas cooking and water-heating have "arrived." If only kitchens were constructed, as the kitchen in my own house is constructed, with just an ordinary fireplace in which the servants, when they have finished the day's work, and want to sit down and be comfortable in the evening, can light a fire—whether it be of coal, gas, peat, or logs—and a tiled or cemented recess were provided in which the tenant could have installed either a coal-range or a gas cooking-stove, there are very few households that could not with advantage in every respect use gas for cooking throughout the year.

There are now, in London alone, about 750,000 gas-cookers used by consumers whose means are so limited that it is a convenience and an advantage to them to buy their gas a pennyworth at a time through automatic meters; and proportionately the same is true throughout the kingdom. If gas had not been proved by experience to be more economical to use than coal, is it likely that the housewife, who has to look at both sides of every penny before she spends it, and who in many cases plans out her weekly budget in pennyworths and halfpennyworths, would, almost to a woman, have adopted, and continued to use, gas for cooking whenever she could possibly dispense with her coal-fire for other purposes? The question provides its own answer. The costliness or the economy of cooking by gas is all a question of common sense and ordinary care. The whole trouble of excessive cost in the use of gas for cooking, where it occurs, lies in the ignorance or the thoughtlessness of the servants; it rarely arises where the mistress of the house does her own cooking—never when she has once learned how to use her stove. There is quite a simple remedy if a mistress finds that she cannot induce her maids to exercise reasonable care, and that is to have a subsidiary or "check" meter, which can be obtained for a small rental, fitted to the supply to the cooking-stove, and then take a reading of the check-meter regularly every week. This plan of a weekly check on the kitchen gas bill has been adopted with success in a number of cases within my knowledge.

I want to say a word in favour of the gas-cooker on account of the valuable work it has done in improving the physical and moral well-being of the working classes. The advantage to the physical well-being of the working man of having well-cooked, nourishing, hot food provided for him every morning before he leaves for his work, without necessitating his wife, daughter, or himself rising at an unearthly hour to light a coal-fire, cannot be over-estimated. The evil consequences of beginning hard work without proper food, in such a climate as ours, do not need to be enlarged upon. But it is not realized as it should be what an important effect there is on the moral well-being of the working man if, in addition to a good breakfast on leaving home, he can also count on a well-cooked hot supper when he returns in the evening wearied with his day's work. The gas-cooker, with a woman to use it who has a reasonable knowledge of cooking, is the worst enemy to the publican that has yet been invented. The wretchedly bad cooking in his home has sent many a man to the public-house to get his refreshment and comfort in the evening. I do not think I am exaggerating when I say that the steady increase in the sobriety of the country in recent years is to an appreciable extent due, first to the better knowledge of cooking now possessed by the average working-man's wife; and, secondly, in no small measure, to the advent of the gas-cooker, to enable the working-man's wife to put her knowledge to practical use without any tiring, dirty work, and at an exceedingly reasonable cost.

The prejudice against gas for cooking still lingers in the minds of some who readily acknowledge its convenience—the prejudice, I mean, that some persons feel against having their food cooked in an oven wherein gas is burnt, and against so-called "noxious fumes," which consist of water vapour and carbon dioxide—an inert and perfectly innocuous gas. It is a curiosity of psychology that people who will insist on having a steak or a chop cooked on a coke-grill, where it is enveloped in carbon monoxide and sulphurous gases that might well be described as noxious fumes, are sometimes the very people who tell you that "they always know when food has been cooked in a gas-oven." The curious part about it is that they are never known to refuse or criticize food that has been so cooked when it is served to them in a West-end restaurant. Imagination is indeed a magic force! Those who entertain this suspicion of gas-cooked food may be reassured. The "Lancet"—that vigilant and even alarmist guardian of the public health—made the question the subject of careful inquiry some twenty years ago, and exonerated gas-cooked food from the suspicion of being affected by the products of combustion.

After pointing out how gas can solve the hot-water problem, the author concluded with the following brief reference to electricity for cooking: It may be said that, in discussing the question of cooking and water-heating, I have said nothing about electricity. My reply would be that it is not a practical proposition at the price, or anything approaching the price, at which electricity is at present offered to the public for fuel purposes. I have, indeed, yet to meet an electrical engineer who is running his undertaking for profit (not one who has charge of a municipal undertaking, where the policy is too often one of finding "food for the elephant," regardless of the cost) who has any faith in the possibility of electricity being adopted generally as a fuel for domestic purposes. Even if electricity were obtainable at a farthing per unit, it would still be necessary to bring about a big reduction in the cost of the apparatus, and to ensure the maintenance of this apparatus in efficient working order at a much lower cost than is possible at the present moment, before electrical cooking could be regarded as a practical proposition to put before the average householder.

Dr. PRICKETT moved a vote of thanks to the author. Everybody must now agree, he said, that the substitution of gas for coal led to extremely hygienic results; and he hoped there would be a still further adoption of gas for all purposes in the future.

Mrs. W. E. PRICE, who seconded, suggested that the paper should be distributed broadcast to householders who use gas, because it was seldom they had such instructions from any other sources as had been given by Mr. Goodenough in his paper.

Lady YOXALL said the point that had struck her most forcibly was that if only women, whether paid domestics or housewives, could be brought to realize thoroughly the advantages to themselves of the use of gas cookers and fires generally throughout their houses, and that they would be relieved of a considerable amount of work, exceedingly good results would follow. Mr. Goodenough had touched upon the temperance movement; and, as one keenly interested in this, she absolutely agreed with him when he said that if men and women only had a sufficient supply of properly cooked food, the terrible drink evil would not exist to such an extent as it does now. An enormous assistance in this direction would be the more general use of gas-cookers, and the getting of women really to understand gas cooking. The matter rested largely with those interested in this movement.

The vote of thanks was put to the meeting and carried.

Mr. GOODENOUGH, in reply to Lady Yoxall's last point, said that if the social workers of London and elsewhere could do anything in the way of getting working women to receive instruction in the use of gas for cooking economically, he was quite sure the gas managers of London and the country would be only too happy to co-operate with them. The great difficulty was to get the women together, and to give them any instruction at all; and if social workers could help in this direction, the gas industry was anxious and ready to assist—believing that, in doing so, they were really

performing a public work, as well as, perhaps, something that would be no disadvantage to themselves.

Lady YOXALL said that, as a matter of fact, during the present year a health week was held at Richmond, and something was done on these lines. A very large audience gathered together, and had demonstrated to it the value of gas in as many different ways as possible.

THE HOUSEWIFE AS THE BURSAR.

Miss MABEL ATKINSON, M.A., read the final paper, which dealt at length with the problems of the housewife. She said it was in respect of the impossibility in the case of most families of incurring any large capital expenditure that the plans adopted by gas undertakings had proved such a boon. The companies had grasped the economic difficulties of the housewife. They understood that she could not experiment and could not pay out "on the nail" a large sum for gas installations for cooking and heating. The systems of hire and hire-purchase of stoves and geysers, tested and explained by experts, exactly solved the housewife's problem. She was enabled to make a regular recurring payment, which she could meet easily enough out of her periodically-paid housekeeping allowance; and for this she received the very latest results of scientific investigation into the best methods of heating and cooking, and also the use of expensive apparatus, without the need of "planking down" a lump sum for buying the apparatus outright. The gas companies deserved much credit for working out this system of hiring. What was needed was some way by which the woman, secluded in a backwater of society, ignorant of modern science, and hampered by the peculiarities of her economic position, could be brought, by an agency which realized her economic difficulties, into touch with the discoveries and possibilities of applied science. This exhibition was at least one way. Some might scoff because its main object after all was commercial; but the commercial motive had at least some advantages—it acted steadily and it promoted enterprise. In the absence of a united and intelligent body of housewives organized co-operatively for the investigation and adoption of new devices for making housework quick, easy, and pleasant, they might be glad that the commercial motive led other people to thrust on the disunited and rather conservative women who ran the households of this country the advantages of gas-fires and gas-cookers. She also had some well-deserved words of praise for the penny-in-the-slot meter for poor consumers.

The paper was followed by a brief conversational discussion; and a vote of thanks to the author brought the proceedings to a close.

POPULAR LECTURES.

HINTS TO GAS CONSUMERS ON HOW TO GET VALUE FOR MONEY.

On Thursday evening, Mr. JOHN YOUNG delivered a very interesting lecture on this subject, and first referred to the well-known remark of the late Mr. Colman that money was made not by the mustard that was used, but by the mustard that was left on the plates. The gas supplier, however, was not desirous of making his money by the gas which was wasted. He impressed upon his audience the fact that the gas manager hates to think that the material he has produced is being wasted, and one reason was his own personal business comfort. For it was this waste that sent the enraged gas consumer to the gas office accusing the manager of the most diabolical dishonesty—they also blamed the gas-meter—whereas in many cases it was simply through the carelessness of the consumers in leaving the gas-jets on when they were not required. He thought that the expression "He lies like a gas-meter" must have arisen in this type of household; and in describing the gas-meter, he pointed out that the loss of the gas companies through defective working, resulting in the consumer obtaining a certain amount of gas which was not registered, meant about 2 per cent. of their total output.

After expressing astonishment that flat-flame burners were still in use in some houses, Mr. Young called attention to that nuisance (which, however, is rapidly becoming less common) of the work of an ordinary local plumber upon gas installations, and emphasized the willingness of all gas companies to maintain consumers' installations at a nominal cost. He referred to the necessity for keeping incandescent burners clean, as, though the upward current of air draws through the burners a considerable proportion of the air of the room, and dust is deposited in the burner, the bulk of it is arrested by the final mixture of the air and gas just before the point of ignition, thus causing a loss of efficiency in the light. With regard to the colour of lights, he stated that the greatest authorities on the eye were agreed that a white light is better than any other. In this respect, he hoped the ladies would excuse him if he pointed out another source of waste. The light given from an incandescent mantle was a pure white light; but unfortunately it was a common practice to put coloured globes and shades over them, which had the effect of robbing the light of a large proportion of its efficiency. One of the most pleasant effects was a pink shade; but this was very injurious to the eye. In this connection, he related his experience at the time he thought he would like a pink drawing-room in his own house. He happened to invite some friends; and, after being in the drawing-room for some time, they adjourned to the dining-room, which was white, and everything in the room appeared to them a bright blue. Needless to say, he had his drawing-room changed.

Mr. Young called attention to the contrivances often met with which claimed to save 50 per cent. on gas bills, and at the same time give more light, &c. But though these economizers were supposed to minimize the tendency to extravagance, the general effect of them was to check the gas enough to destroy the effect of the bunsen flame, without having any effect on the gas bill. The result was the consumer promptly blamed the gas supplier.

With regard to heating, the best way to get value for money was to obtain a good type of stove, and one that would do the work for which it was required. For instance, it was no use getting a stove designed to heat a room 10 feet square, and installing it in a room 20 feet square. The burners should always be kept clean, especially during the summer months, when they were apt to get very dusty; and at the approach of autumn all gas-fires should be overhauled and cleaned. He also laid stress on the importance of getting the best kind of flame, and pointed out that an improperly lighted bunsen burner is not only inefficient but dangerous. He referred to a letter which he had received from a consumer saying that the gas he supplied had lost all its heating power; but on inspection it was seen that there was no asbestos or similar fuel in the stove. He also advised users of gas-fires never to allow the flame to be seen above the top of the fuel.

On the question of gas-cookers, these were, said Mr. Young, very good servants; but unless properly handled they could be very distressful wasters. Discoloured pans were bad conductors of heat; and he advised the use of aluminium and bright copper pans. Also in relation to gas-engines there was a lot of waste, much of which was caused by the inexperience of those in charge of them. Very often, he said, as long as a man could start an engine and put some oil into the lubricator, he was claimed to be in charge of it. The lecturer emphasized the necessity for proper lubrication, and also for keeping all the working parts clean.

Coming back to the general question of the lecture, Mr. Young said he would like to see every consumer of gas keep a check on the amount consumed. A gas consumer should systematically read his meter every week, just as he wound his clocks. In this way, waste could be at once detected and stopped. He mentioned a case where a man had detected a smell of gas in his house; but being a man who kept a check on his consumption by reading his meter periodically, he was convinced, from an inspection of the meter, that there was no escape from his mains. After speaking to the man next door, it was found there was a certain amount of gas escaping from that house into the first house.

A PENNYWORTH OF GAS.

The popular lecture on Saturday evening was delivered by Dr. C. W. SALEEBY, who had given it the above title; but though one could trace very little connection between the title and the subject-matter, the lecture was nevertheless of absorbing interest. That the audience thought so, was demonstrated by the very flattering reception the lecturer received at the close. During a large part of the forty-five minutes during which he spoke, Dr. Saleeby, talking as a student of medicine and hygiene, dealt with the pollution of the atmosphere and its disastrous effect upon all public and individual health—a state of affairs to be practically overcome by the universal adoption of gas and the abandonment of coal as a domestic fuel. He impressed upon his audience that, to all intents and purposes, manufacturers cause little pollution of the atmosphere, so largely had the direct burning of coal been abandoned, and that domestic users, by continuing to burn coal, were themselves the cause of all the evils which followed from the smoke-laden atmosphere of large towns. He urged upon the public not to treat the question of the London atmosphere as a joke, as seemed to be the general view. The healthy condition of the people in Continental countries where there was practically no coal almost suggested that, though coal was England's greatest industrial blessing, it was at the same time a national danger—at any rate, when burnt in the uneconomical manner of the open grate. On the other hand, the potentialities of coal, when properly treated, were astonishing.

The lecturer then passed on to the question of heating by gas-fires, and condemned all forms of heating other than radiant heat—being particularly severe upon all systems of central heating. In this connection, he commented upon the heating of the House of Commons. There had been established there a most expensive and complete system of ventilation which was fundamentally wrong in principle. Instead of having radiant heat and moving air, relatively cool, which stimulated the surface of the skin and the internal surface of the lungs, hot air was pumped in over such a wide surface that there was practically no appreciable motion of it. Finally, Dr. Saleeby strongly supported the views expressed by others during the exhibition—that a better appreciation of good gas cooking on the part of working men's wives would do much to keep men away from public-houses.

ORIGIN AND HISTORY OF ARTIFICIAL LIGHTING AND HEATING.

Mr. E. LOVETT's lecture on this subject on Wednesday formed an admirable corollary to that given by Mr. Miller Christy, on "Methods of Fire Making," on Oct. 13 [*ante*, p. 218], Mr. Christy explained fire making; while Mr. Lovett dealt with the manner in which the ancients applied their knowledge. The lecture was

delivered solely by the aid of the lantern, and consisted mainly of descriptions of the various forms of apparatus to be seen in the historical section of the exhibition. At the conclusion, Mr. Lovett pleaded for some national museum in which these very valuable historical relics could be housed.

CONSTRUCTION, OPERATION, TESTING, AND READING OF A GAS-METER.

This was the subject of a lecture delivered on Monday last week by Mr. W. H. Y. Webber. In his opening remarks he explained that when most of the present large gas undertakings began business, gaslight was supplied under time contracts. This system was unsatisfactory, for reasons which he indicated, and consequently means were sought of selling gas by measure; and the production of the meter was the result. A satisfactory gas consumer's meter must, said the lecturer, fulfil numerous apparently contradictory requirements. It must be reasonably accurate and trustworthy—say, up to the standard of a good watch; must be durable; must work with but little driving power, which must also be obtained from the gas; must measure with equal accuracy the smallest and the largest volume of gas passing through it; must be reasonably safe in action; must be fairly immune from fraudulent interference; must not jump, stick, or make a noise; must be inexpensive; and its indications must be easily read, in terms of the commercial measure of the gas. Above all, it must be susceptible of thorough verification, so as to be stampable as a correct measuring instrument, according to the law as to weights and measures in general.

The foregoing being the initial conditions necessary to be fulfilled, the lecturer said it was not wonderful that half-a-century elapsed after the introduction of gas supply before a meter was made to pass the tests of experiment and practice. The initial attempt was due to the ingenious Samuel Clegg—the first engineer of the pioneer gas company, now the Gaslight and Coke Company—who tried an arrangement which appeared to anticipate the wet meter which came later, though Clegg missed the essential of unoscillating filling and emptying. The wet meter was taken in hand by a succession of clever mechanicians—Malam, Crosley, and many others—down to Warner and Cowan in our own time. As a positive measurer of the volume of gas constantly passing through it at a steady pressure, the lecturer said, it was perfect. It was therefore employed extensively when gas had to be measured with the greatest accuracy for scientific or legal purposes. It had, however, failed to maintain its position in the ordinary service of private consumers, and had given place to the more convenient dry meter, which satisfies the requirements of the law and of the business quite as well as its predecessor, and gives less trouble. The dry meter has consequently supplanted the wet one, if not altogether throughout the kingdom, at least so largely as to justify the rest of the discourse being devoted to it.

The lecturer then dealt successively with the gibes at the dry meter by professed humorists; to the law and the science of gas measurements for the supply of private consumers; and to the method of testing meters, which could be seen in the exhibition. He said it was to be desired that consumers should show a little more interest in their meters and their location in the house. By regularly inspecting his meter at reasonably frequent intervals, the consumer would be able to check waste and extravagance in the beginning, which was better than finding them out too late through the presentation of a staggering gas bill. More especially was this caution to be emphasized upon the adoption of any fresh piece of apparatus—such as a cooker, water-circulator, or gas-fire. The more often the meter was consulted, the less would it be maligned. Many suspicious consumers had been satisfied by a monthly reading; while the user of a slot-meter invariably regarded his meter with the utmost respect.

The lecture was followed by a demonstration.

USE OF GAS IN FACTORY AND WORKSHOP.

Last Tuesday evening Mr. Webber gave a lecture entitled "Some Practical Hints on the Use of Gas in Factory and Workshop." Dealing first with lighting, he said that the most open and above-board application of gas in factories and workshops is for the universally necessary purpose of artificial lighting. Vast as the general advantage of modern improved gas lighting has been in every department of the advance from the old flat-flame standard of illumination, both for exteriors and interiors, in none has it proved a greater boon than in the busy centres of organized labour. He then went on to show why factories and workshops are better served by gaslight than by any other means. In the first place, as regards the scale and scheme of any lighting job—meaning by the first expression the degree, and by the latter the style of the service—gas alone can be had in units of any power, from the same supply. Gas will serve for the safety flat-flame lights of stable yards, exits, cellars, danger spots, &c. It is equally available outdoors and in. It is steady, reliable, does not hurt workpeople's eyesight, and is cheaper than any other illuminant equally available. It is not only less expensive, light for light, but it is cheaper to instal and maintain; and the skill required for attendance is moderate. Everything about it is within the capacity of an ordinary mechanic to look after.

The comparison of the working cost of gaslight in a factory or workshop is not with flame or open arc electric lamps, which are unsuitable for the purpose, but with metallic wire incandescent electric lamps, as to which it is claimed that the latest will give an average of a candle power of light for every half-watt of energy. If it is assumed that the most convenient lighting unit for the job is 600-candle lamps, and granting the electrical efficiency named, this means an hourly consumption of 300 watts per lamp—say, about three such lamps should run to a Board of Trade unit of current per hour. The lecturer said it was hard to know at what price to quote the unit for a mean example, because some electricity undertakings appear to prefer to give their commodity away, which gas undertakings had not yet found it necessary to do. A fair manufacturing cost would be about 3d. per unit. The estimate on this basis would therefore be:

Electric Light.

Per 600-candle tungsten wire lamp, at a reputed (unproved) efficiency of half-a-watt per candle power, for 1000 hours current 300 Board of Trade units, at 3d. .	£3 15 0
Maintenance (estimated)	0 10 0
Total	£4 5 0

Gas Lighting.

Per 600-candle high-pressure inverted lamp, proved efficiency 60 candles per cubic foot consumption, for 1000 hours 10,000 cubic feet, at 2s. 6d. per 1000 . .	£1 5 0
Maintenance	0 3 0
Total	£1 8 0

The selection of the most suitable size of lighting units, their elevation and spacing, must be decided with regard to the conditions. Fortunately, gaslight is so cheap, and its installation so simple, that actual experiments can be easily made on any scale. The choice is open as between high-pressure, ordinary main pressure, and air-pressure systems. On wide grounds the preference falls upon the first named, for a variety of reasons. A public high-pressure supply can now be had in many places; on the other hand, no factory need be deprived of the manifold advantages of a high-pressure gas service, which are not limited to lighting, since the actual mechanical pressure-raising is a bagatelle, costing less than 1d. per 1000 cubic feet. The argument for high-pressure gas is that it is completely under control. The question of supplementing the general lighting of the shop by small local lights close to the workers or their tools is one to be solved by carefully consulting the workers themselves, and conforming to what they are accustomed to, unless it can be improved upon. No hard-and-fast rule can be laid down for these cases, which refer mostly to fine work. Strong local lighting calls for particular care in shading, so that while the light falls upon the right place, the luminous source itself is hidden. On general principles, concentrated local lighting ought to be accompanied by adequate distributed lighting, because nothing is worse than the eye-strain caused by glancing from bright places to dark spaces.

Dealing next with the use of gas as an industrial fuel, the lecturer remarked that schemes had been drawn up, and revived from time to time, for supplying London with "fuel gas"—meaning something other than the gas already laid on throughout the Metropolis. As to all such schemes, it was enough to observe that while there are other kinds of gaseous fuel quite suitable for particular uses in the arts and manufactures, and while it is certain that the present barbarous method of burning coal (which can never be replaced) for its fire heat alone must before long give place to some gasifying method, there is no likelihood that the character of town gas will ever be radically changed. Therefore, those manufacturers who carry on business in large towns must turn to the ordinary gas service if they seek a public supply of fuel gas. This was not any hardship, for town gas is the strongest fuel gas that can be made from coal; and when regard is also had to the uniformity of its calorific and flame values, and its relative purity, it does not compare badly in any large centre with the cost and trouble of making a substitute.

The lecturer went on to say that if his audience would look at the specimen applications of ordinary gas as fuel for various industrial purposes shown in operation in the exhibition, illustrated by photographs, or remembered as in every-day use by thousands of workers in necessary trades, they would see a few indeed that had been devised "on spec." Usually it had been a case of the manufacturer coming to the gas man to ask whether he could assist him in getting over some difficulty, or avoiding trouble with the Sanitary or Home Office authorities. He wanted a copper-bit heater, or a safe glue-pot boiler, or a powerful blow-pipe, or a way to get rid of the dirty, smoky blacksmith's forge. As the demands had crystallized into particular forms, the apparatus manufacturers had improved and developed them. In this connection, the lecturer paid a tribute to the work of his friend the late Mr. A. W. Onslow, in developing high-pressure gas lighting and heating on a large scale, at the Woolwich Arsenal; and to another pioneer in a similar line—Mr. E. C. Riley, who, as gas engineer at the Great Western Railway works at Swindon, introduced gas with compressed air for various foundry and workshop purposes. He mentioned these examples as illustrating the wide range of opportunity for the advantageous use of gas, besides the formal applications indicated by specially constructed apparatus which could alone be seen in an exhibition.

The concluding portion of the lecture was devoted to the advocacy of gas for cheap and reliable power production. On this subject, he said: In London, town gas is used to generate power directly by means of far more and larger gas-engines than is generally suspected. If I had to advise a manufacturer on

the lay-out of a power factory in the Metropolitan area, it would have to be a very unusually large order which I should hesitate to fill by this means. I should point to the example of the new Barking Sewage Pumping-Station of the London County Council, comprising seven 500 H.P. engines, whose standard efficiency is a consumption of 14·8 cubic feet per brake-horse-power per hour. I should remember the power installation at the "Gothic" factory of Messrs. Glover and Main at Edmonton, for which a 9-inch main was laid from the Tottenham and Edmonton Gas-Works, supplying 90, 60, and 50 H.P. engines, besides smaller ones. I should also recall the numerous instances recorded in the books of every London and Suburban gas company of power users who have abandoned electricity for gas. Prominent among these is the Fermoy Road Sawmills, at Paddington (Messrs. W. P. Bailey and Co., Limited), who testify, in a document dated June 30 last, that, having been able to make a correct comparison of the cost of running a 36 B.H.P. gas-engine, as against that of the electric motors formerly used for their work, they find the former to be only one-half that of the latter, with current at 1½d. per unit. This experience corroborates the theoretical comparison between the power capacity and cost of electricity and gas. The latter statement is not at all complicated: One Board of Trade unit of electricity is equivalent to 1·3 H.P. Taking the mechanical efficiency of an electric motor at 85 per cent., this works out to a consumption of (say) 880 watts per hour. With electricity at the price of 1d. per unit, the cost is therefore only 0·88d. A fair average gas consumption for modern engines is 18 cubic feet per B.H.P. per hour. With the selling price of gas at the level figure of 2s. per 1000 cubic feet, the cost of one B.H.P. is under 0·45d. Not many theoretical and practical computations balance so closely as this.

The lecture was illustrated by lantern pictures.

COOKERY HALL.

The hall, as during the previous weeks, continues to be the centre of attraction to all visitors (men as well as women). Great interest is taken in the lectures, and many are the questions asked at the conclusion of each. The accommodation, though equal to seating 300, is far too limited; and numbers are unable to gain access.

Madame Alting-Mees, one of the pioneers of gas lecturing in England, who is now better known on the Continent, gave two very interesting demonstrations, mentioning the fact that in giving her series of lectures abroad she always includes one on what can be cooked with a boiling-ring only; her point being that, if a housewife will just start with having that, a very few weeks will elapse before, finding the great utility of it, she will not rest until she possesses a gas-cooker. A lecture will therefore be given next Saturday evening to illustrate this idea; and Miss Mary Wilson will show what can be done.

The other well-known lecturers were Madame de Lissa, Miss Tuxford, M.C.A., and Miss Mahalm (from Dublin), all of whom gave their hearers points on the economical management of the gas-oven, and turned out some excellent dishes.

The visit of the Lady Mayoress to distribute the prizes won by the successful competitors (who compete twice daily in the annexe) is fixed for Friday next at six o'clock. The entries have been very numerous, and the cooking has been so well done that it will involve a large number of prize winners.

DIARY OF EVENTS.

NATIONAL GAS CONGRESS AND EXHIBITION, October, 1913.

DAILY ATTRACTIONS.

STRING BAND OF THE SCOTS GUARDS, 3 to 4.30 and 6 to 7.30, IN THE DOMESTIC SECTION HALL.

MILITARY BAND, 8 to 9.45, IN THE DOMESTIC SECTION HALL.

MUSIC IN THE TEA ROOM, 4 to 5.

COOKERY LECTURE AND DEMONSTRATION AT 4 and 7.30 (EXCEPT 7.30 ON OCT. 31).

PRELIMINARY COOKERY COMPETITIONS up to OCT. 25 [INCLUSIVE] DAILY AT 2.30 and 6 (EXCEPT OCT. 22 and 23).

Tuesday, Oct. 28.

11 a.m.—**Conference of Employers.**

Papers to be read:—

"Co-Partnership as a Means of Increasing the Prosperity of both Capital and Labour." By Aneurin Williams, Esq.

"The Relation of Science and Industry." By Surgeon-General Sir Alfred Keogh.

"Co-Operation between the School and the Employer." By Cloudesley Brereton, Esq., L. ès L. Paris, and D. Milne Watson, Esq.

"Natural Law in the Commercial World." By A. F. Sheldon, Esq.

2.30 p m.—**Final Cookery Competition for Territorials (A and B).**

6 p.m.—**Final Cookery Competition for School Children.**

8 p.m.—POPULAR LECTURE; "Practical Hints on the Use of Gas in Factory and Workshop." By W. H. Y. Webber, Esq.

Wednesday, Oct. 29.

11 a.m.—**Conference of Manufacturers.**

Papers to be read:—

"The Lighting, Heating, and Ventilation of Factories and Workshops." By Professor Vivian B. Lewes.

"Gas as a Fuel for Industrial Purposes." By Professor W. A. Bone.

"The Economic Value of Adequate Illumination." By Leon Gaster, Esq.

"The Matching of Colours by Artificial Light." By T. Thorne Baker, Esq.

2.30 p.m.—**Final Cookery Competitions for Boy Scouts, Girl Scouts, and Church Lads.**

6 p.m.—**Final Cookery Competitions for Sea Scouts and Territorial Nurses.**

8 p.m.—POPULAR LECTURE: "Practical Hints on the Use of Gas in Factory and Workshop." By W. H. Y. Webber, Esq.

Thursday, Oct. 30.

2.30 p.m.—**Final Cookery Competition for Cook-Generals.**

8 p.m.—POPULAR LECTURE: "The Silent Servant." By Miss Constance Williams.

Friday, Oct. 31.

6 p.m.—**Presentation of Prizes to Winners in Cookery Competitions by the Lady Mayoress of London.**

8 p.m.—POPULAR LECTURE: "A Pennyworth of Gas." By Dr. C. W. Saleeby.

Saturday, Nov. 1.

8 p.m.—POPULAR LECTURE: "Construction, Operation, Testing, and Reading of a Gas-Meter." By W. H. Y. Webber, Esq.

The Use of the Rare Earths.

We have received from the publishers, Messrs. Veit and Co., of Leipzig, a book bearing the above title by Dr. C. Richard Böhm. The work, which the author entitles "a critical review," deals with the rare earths in all their applications, scientific and industrial; and ten illustrations are included in the text of 107 pages. In a short introduction the author refers to the important part played by the rare earths in incandescent gas lighting, which he considers was the salvation of gas in its early fight with electricity. But the literature already in existence on this subject is, he says, so voluminous that he does not deal with it extensively—referring readers for details to previously published works on the subject. However, as a general survey of the rare earths industry, the book is highly interesting. The price is M.4.50.

Heat Waves.—With the compliments of Messrs. R. & A. Main, Limited, three clever sketches reach us, bound in a cover bearing the title of "Heat Waves." The skits, which are signed "Fred Perry," are directed to recent radiant heat efficiency and hygienic efficiency claims. They are amusing. But facts remain facts; and the thing of chief importance is that gas-produced heat waves will be more in evidence than ever in British homes during this autumn and approaching winter.

Town Distribution Systems.—We have received from the publishers, Messrs. R. Oldenbourg, of Munich, a work in German by Paul Brinkhaus, entitled "Das städtische Gasrohrnetz" ("Town Gas-Distribution Systems"). The subject is dealt with in all its aspects, from the calculation of pipe dimensions and high-pressure distance distribution schemes to the work of installation of street mains and house services. The text of 134 pages is well illustrated with 69 figures, and is supplemented at the end by several folding plates. The price of the book is M.5.

CHARLES EDWARD BOTLEY.

It is with sincere regret that we announce the death last Wednesday, at his residence at Hastings, of Mr. Charles Edward Botley, the Engineer and General Manager of the Hastings and St. Leonards Gas Company. Being a man of robust and active habits, it was not noticed until quite recently that he was failing in health. Nothing serious developed until about two months ago. On the advice of a medical man, he went to Llandrindod Wells, but on his return no improvement was noticeable, and he consulted a London physician. He gradually became worse, but was in his office the Saturday before his death. The news of this sad event evoked general sympathetic expressions from residents in the two towns served by the Company, for Mr. Botley was held in great respect. There will be many who will mourn the loss of a sincere friend—among them being the Company's employees, who held him in the greatest esteem.

Mr. Botley was born in London in 1848, and at the close of his school days took up the study of gas manufacture and engineering. In 1873, much attention was being directed to the process of gas making then carried on by the New Gas Company, which was one of the most determined attempts of modern times to introduce water gas into this country. The process was tried, under the direction of Mr. R. P. Spice, at various established gas-works, including those at Wormwood Scrubs. His proceedings were watched with great interest, and he gave an account of his system at the meeting of the British Association of Gas Managers in 1875. Curiously enough, in the light of recent changes in coal carbonization, the essence of his method lay in the use of vertical retorts. Mr. Botley was the Assistant-Manager of the works, and when Mr. Spice retired in 1875, he took entire charge of them. Shortly afterwards the manufacture of water gas was given up, and the plant was re-arranged for the production of coal gas; considerable extensions being carried out by Mr. Botley. In 1880 the works were acquired by the Great Western Railway Company, and Mr. Botley was appointed Engineer, and entrusted with the control of all the gas-works on their system. In the succeeding years he devoted a great deal of attention to the lighting of railway carriages, on which subject, it will be remembered, he was an acknowledged authority.

On the retirement of Mr. Alfred H. Wood, the Manager of the Hastings and St. Leonards Gas Company, early in 1887, Mr. Botley was chosen, out of 68 applicants for the position, as his successor. He had not been very long at Hastings before he was made conscious of the growing inadequacy of the works to meet the demands upon them; and by 1898 they had become so congested that he advised the Directors to obtain power to construct entirely new works. This was done, and they were erected on a site 20 acres in extent at Glyne Gap, about four miles from Hastings in the direction of Bexhill. These works were fully described and illustrated in the "Journal" in 1903. They were visited by the Institution of Gas Engineers in 1905 (when Mr. Daniel Irving was President), and their details explained by Mr. Botley and his son and Assistant, Mr. Charles F. Botley, Assoc.M.Inst.C.E. The members of the London and Southern District Junior Gas Association were accorded the same privilege in June last. Mr. Botley had of late years to contend against the inroads of electricity in his district; but the conspicuous ability with which he and his son did this will be fresh in the recollection of readers of the "Journal."

Mr. Botley joined the British Association of Gas Managers in 1875, and passed into the Gas Institute, on the Council of which he served in 1884. He left it, however, on the formation of the first Institution, and enrolled himself a member. On the amalgamation of the two bodies at the close of 1902, however, he became absorbed in the larger organization. He was one of the original members of the Southern District Association of Gas Engineers and Managers, and was President in 1885. At the meeting of the first Institution in May, 1897, Mr. Botley, in association with his son, read a paper on "The Carburation of Coal Gas." In it a full account was presented of the naphthalene difficulties encountered at Hastings, and a complete statement was given of the various means tried to overcome them, all of which had proved failures until the carburation system was invented. This subject was referred to in the volume of the "Journal" for the second half of 1898, and it was further dealt with in a paper read before the Southern Association at their meeting in November of that year, when Mr. Botley gave the results of his extended experience with the process. He was admitted into the Institution of Civil Engineers as an associate member in 1877, and was raised to full membership in 1897.

Mr. Botley was a prominent Freemason, and belonged to the Derwent Lodge, of which he was a Past Master, and was a Past Provincial Grand Superintendent of Works for the Province of Sussex. He was a Past Master of the East Sussex Mark Lodge of Freemasons, and Past Provincial Grand Registrar in this degree. He was a P.Z. of the Emulation Chapter, of which he was also a Past Provincial G.O. In addition to the foregoing, he was a Past M.W. and S. of the Rose Croix, of which he was Recorder up to the time of his death, and a Past E.P. of the Knights Templars Preceptory, of which he was Treasurer. He was one of the few Masons in Hastings who had attained the high position of the Thirty-First Degree in Freemasonry. He was one of the founders of the new Masonic Temple at St. Leonards; also founder and first Master of the Priory Lodge, Acton.

As many of his professional colleagues are aware, Mr. Botley was passionately fond of music, and was a good bass vocalist. He was for a considerable time a member of the choir of St. Clement's Church, Hastings, in the restoration of which fine historic fabric he took great interest, being on the Executive Committee of the Restoration Fund. He was also a member of the Secondary Education Committee, was one of the Managers of the School of Science and Art.

Mr. Botley leaves two sons—Mr. Charles F. Botley, now the Assistant Engineer and Manager at Hastings, and Mr. Herbert Botley, a member of the Royal Academy of Music—and one daughter. The funeral service (which was choral) was held yesterday afternoon at St. Clement's Church; and the interment took place at the Cemetery.

PERSONAL.

Councillor Fred J. West, of Manchester, has been returned unopposed to the Manchester City Council, as representative of the Newton Heath ward.

Mr. W. W. Townsend, for more than seven years Gas Manager to the Hereford Corporation, has been appointed Manager of the Colchester Gas Company, in succession to Mr. Herbert S. Pike, whose resignation was announced in the "Journal" for the 2nd of September. Applications for the position were invited in the succeeding issue.

Some indignation is felt in Manchester (writes our correspondent) that Councillor W. Kay, J.P., the Chairman of the Gas Committee, and one of the most popular members of the Council, should have been put to the trouble of a contest in connection with his candidature for the St. George's Ward. It was confidently anticipated that Mr. Kay would have been returned unopposed; but at the last moment, Mr. A. Mole, a postman, was nominated in opposition. Mr. Kay's re-election is regarded as a foregone conclusion; and it is confidently anticipated that the ratepayers will vote so solidly for him as to make his majority a record one.

At the meeting of the Blackpool Corporation on Monday last week, Mr. William Chew was appointed Gas Engineer and Manager, in succession to his father. The position, it may be remembered, was thrown open to competition; and three of the candidates were selected as the most suitable to fill it. One withdrew, and the other, who was from a neighbouring county, was specially favoured by a member of the Council. But it was thought that it would be particularly hard upon Mr. Chew if, with his extensive local knowledge, he had to give place to a stranger. Consequently, the voting was ten for him against three for the other candidate. This decision was afterwards confirmed by a unanimous vote. The salary is £400 per annum.

OBITUARY.

The death took place on Thursday evening of Mr. Edward Barton, J.P., Managing-Director of the Carnforth Iron-Works Company. Deceased, who was in his 84th year, was mainly instrumental in the formation of the Carnforth Gas Company and the Carnforth District Water Company, over forty years ago; and he had been Chairman of both concerns from their inception.

The death has recently occurred, at the age of seventy-four, of Mr. James Young, the Chairman and Managing Director of Messrs. James Young and Co., railway and public works contractors, of Glasgow. Among the important works carried out by the firm were the Gryffe Greenock water reservoir, a part of the aqueduct from Loch Katrine, and mains in connection with the Glasgow water supply, and the Glenquey reservoir. Mr. Young was a Director of the Coatbridge Gas Company, and a Justice of the Peace for Lanarkshire. Deceased is survived by a family of seven daughters.

Institution of Municipal Engineers.—At the fifth annual general meeting of the Institution, to be held in the Council Chamber, 9, Southampton Row, W.C., on the 7th prox., a paper on "Electricity as a Bye-Product" will be submitted by Mr. R. J. Spencer-Phillips, Assoc.M.Inst.C.E. In the evening there will be a *conversazione* at the Holborn Restaurant, and a reception by the President, at which the Right Hon. the Lord Mayor (Sir David Burnett, Bart.) will be present.

Yorkshire Junior Gas Association.—The annual meeting of this Association will be held on the 8th prox.—rather later than usual on account of the joint visit of the Junior Associations to the National Gas Exhibition. Mr. H. Hartley, M.Sc., late holder of the Institution's Research Fellowship, and now Chief Chemist to the Richmond Gas Stove and Meter Company, Limited, at Warrington, will lecture on "Gas-Fires." The President of the Institution (Mr. Edward Allen) will be present on the occasion, and we understand a number of gas engineers in the West Riding will attend the meeting to assist in welcoming him to Yorkshire.

ELECTRICITY SUPPLY MEMORANDA.

"THE various committees of the Bath City Council are, we are glad to note, really imbued with the idea of mutual aid." These words are quoted from the "Electrical Times." They are very pertinent to, and expressive of, a condition of things that the gas industry finds largely exists in local government where an electricity undertaking comes in as an influencing force. In the "JOURNAL" last week, there was an editorial article (suggested by litigation that hovers over the Long Eaton District Council at the instance of the Gas Company) dealing generally with some phases of municipal electrical competition of the present day; and it was there mentioned how, through the representation of members of municipal electricity committees upon the various bodies governing local institutions, an influence is brought to bear that is very detrimental to long-established private enterprise in gas supply, and which enterprise contributes heavily through the rates to the local exchequer. We have to thank the electrical contemporary named for the idea of the committees holding the reins of local government having degenerated, through municipal electricity supply, into nothing more than mutual aid societies, no matter whether or not such a condition of things is subversive of public interest. The prompting cause of our contemporary's remark is that the Bath Corporation Surveying Committee have instructed the surveyor to convert street gas-lamps to electricity wherever the Electricity Committee lay new mains. This is mutual aid; and it often takes its defence from curious premises.

Mutual Aid Societies.

In a report to the Council on the subject of metallic filament lamps for street lighting, it is stated that 28 *new* metallic filament lamps of 70-candle power have been installed in three of the Bath thoroughfares, and are giving an efficient illumination. The end lamp, it is said, tested against a three-light incandescent gas-lamp in the same row, illuminated the ground at a distance of 23 yards equally with a cluster of three gas-mantles at 26 yards, though the latter were much more dazzling. The paragraph before us does not say who made the tests, nor is the candle power of the incandescent lamp mentioned. There is also an omission of information as to whether these are old upright burners or inverted ones, and as to whether the new metallic filament lamps are fitted with modern type reflectors. No information is given (the old ruse of electrical engineers) to show whether the newest that electricity can do was compared with the newest that gas can do. On the very face of the assertion, there is something wrong, as is demonstrated by the poor illumination in streets illuminated by metallic filament lamps compared with (say) the side streets of the City of London or Westminster where inverted lamps are fixed. About the point as to the gas-lamps being more dazzling than the metallic filament ones, does the responsible municipal official at Bath know anything of the relative intrinsic brilliancy of metallic filament lamps and incandescent low-pressure gas mantles? His statement seems to clearly suggest that he does not. The learned "Electrical Times" declares that "glare is often mistaken by the layman for illuminating effect." This is precisely what we have for long believed; and the belief has been vastly accentuated by the metallic filament lamp. We had the truth instanced the other night when travelling on the Chatham and Dover Railway, in a compartment fitted with two metallic filament lamps. After straining our eyes attempting to read a newspaper, we had to give up in despair, with a malediction on the head of the person who had been foolish enough to think that he had added to the conveniences and pleasures of travelling by putting such despicable direct lights in a railway carriage.

Illuminating Effect and Glare.

It is quite possible for some local councillors to be swayed into unfair patronage by interest in supply systems with which the local authority do business; but there is the best possible protection against this particular form of favour by specifying what a contractor has to supply, and seeing that he does supply what he bargains for. We take it that a statement bearing upon this subject that appears in "Sanitary Record and Municipal Engineering," as republished in our columns last week, is correct in its details. If incorrect, then we willingly withdraw the comment so far as it applies to the District Council in question. The whole thing, as our contemporary puts it, is "a travesty on local government." The District Council concerned is the Ruislip-Northwood. The area is supplied by the Pinner Gas Company, and the Northwood Electric Light and Power Company, Limited. It is alleged that certain councillors and a prominent official have financial interest in the Electric Supply Company. Tenders were invited for street lighting; and the specification issued contained this important clause: "The gas-burners must be at least 80-candle power; and the electric-lamps at least 50-candle power. These candle powers *will have to be maintained* throughout the lighting season." The unreasonable terms of the clause are probably apparent to all save to certain of the members of the Ruislip-Northwood District Council. Why was it necessary to prescribe 80-candle power for the gas-lamps and only 50-candle power for the electric-lamps, when they were to be "maintained" at their respective candle powers throughout the lighting season? Why were the ratepayers to rest contented with a maintained 50-candle power electric-lamp, when a maintained 80-candle power gas-lamp was stipulated? The very terms of the clause show the desire of its framers to unfairly impose 30 candles more per lamp upon the Gas Company, in order to give the Electricity Company a better chance in respect of their quotation. There could be no question about the District Council getting what they required; seeing that, as the lamps were to be "maintained" at the specified candle power, the Council would, in the interests of the ratepayers, naturally arrange for tests by an independent expert, at whose testings (penalties being attached for default) the successful contractor would have the right to be present for checking purposes. The result of the invitation to tender was this:

Betrayal of Local Government.

	Price per Lamp.		Candle Power to be Maintained.
Gas Company	31s. 6d.	..	80
Electric Company	32s. 6d.	..	50

Thus the Gas Company's tender was 1s. less per lamp for a higher candle power by 30 than the Electricity Company offered. The tender of the Gas Company for lamps of 50-candle power was £1 6s. 6d. Seeing that the lamps had to be "maintained" at the specified candle power, is there any question as to which tender was the more favourable for the ratepayers? A saving could be effected of 6s. per lamp for equal candle power; and a saving of 1s. per lamp and the benefit of an additional 30-candle power per lamp could have been obtained under the Gas Company's tender. But the Council have given the contract to the Electric Supply Company, as well as the provision of the lamp columns, lanterns, fittings, &c., without any competition, and (the "Sanitary Record" says) in contravention of section 174 of the Public Health Act, 1875. How are we to describe these proceedings, with the contract based on the maintenance of candle power, and so with the interests of the consumers adequately defended? What is wanted is a Government-controlled Court of Appeal from such palpable undue favour on the part of local Councils. It is clear the ratepayers in some districts badly need protection against their own representatives in local government.

£500!

If the Electricity Department at Marylebone had many customers like Captain Ramsden to settle with, they would find themselves profitless. He has done more to expose the department at one stroke than all the electrical contractors have ever succeeded in doing. We may just recall the facts. The gallant Captain was dissatisfied with the manner in which the Electricity Department carried out an electrical installation at his house; and he felt that he also had good ground for grievance as to the cost. The matter was submitted to the arbitration of Mr. Albion T. Snell, who confirmed Captain Ramsden's views. His award asserted that the charge of £76 10s. 6d. was close upon £30 too much, and that the work had not been carried out in accordance with the rules of the Institution of Electrical Engineers. The award set Captain Ramsden's solicitors in motion; and they sent in a claim for new wiring work, redecoration, and disturbance of occupation. Negotiations followed; and the Captain agreed to accept £500 in full discharge of his claim. The cost of undoing the work and doing it properly was about £120; consequential damages were placed at £285; and damages were also claimed for interference with the use of the house. When the recommendation as to the payment of the £500 was before the Council (so a report appearing in an electrical paper states), Alderman Fettes declared that, on certain technical grounds, the Committee could have escaped from the whole thing; but it was undesirable that it should be put abroad that the Council wished to quarrel with their consumers. It would be instructive to know what were the technical grounds. As it is the duty of the Council to save and not to squander money, it would be quite within the power of a number of ratepayers to prevent the sacrifice of £500, if such technical grounds really exist. We do not observe, from the brief report before us, that there was any apology tendered to Captain Ramsden for all the trouble and worry he had been put to through the improper work the Arbitrator says was done at his house, at an exorbitant price, by the Electricity Department. The same report also omits to mention whether the persons responsible for the improper work have been reprimanded by the Committee.

Poplar Evasion.

The "Point-Fives" controversy has been continued by a further contribution, by Mr. Nichols Moore (of Newport, Mon.), for the attacking side; and Mr. J. Horace Bowden (for the defence) has published a few evasive comments, in which we cannot find that he attempts to answer anything that is pertinent to the controversy. The letter amounts to nothing more than an ignominious fizzle-out. The body of the letter is given up to a few random remarks on the references to the subject that have appeared in the "Memoranda;" and Mr. Bowden says that the writer has been most eloquent and caustic in his remarks during the last few weeks. Among other things, he observes: "The fact that the gas industry supports Mr. Moore in his endeavour to demolish the Point-Five system is, in my opinion, sufficient to seal his efforts as retrogressive and harmful to his own profession." That

is among the weakest of Mr. Bowden's statements; and it is useful to know that it is only his opinion. Surely because we take an interest in a question of policy, and venture a few opinions on the subject resulting from an examination of it on a somewhat large commercial experience, it need not be taken in the light that Mr. Bowden suggests, nor as an indication that the gas industry wants to support anything that is "retrogressive and harmful" to the electrical profession. It is a question that hardly admits of discussion whether the retrogression does not lie on the side of the man whose acknowledged objective is the supplying of electrical energy on the lines that were so disastrous in the case of early gas supply—that is to say, on payment solely of fixed lump sums. Mr. Bowden does not criticize what has already been said in the "JOURNAL" on the subject of this correspondence; but he is anxious to see from us a final comment on it. His contribution to the discussion on the points in which we are interested has been of such constitution that there is precious little in it that calls for comment.

How Electricity "Savings" are Effected.

Professor J. T. Morris, who read a paper before the British Association on electric cooking, which paper was noticed in our columns at the time, has written to one of the electrical papers thanking them for the "kind reception" accorded to his effort in the way of a "B.A." contribution. When publishing the paper, we called attention to the inconclusive character of the information given; the most conclusive part of the paper being that Professor Morris has found electrical appliances are apt to disturb the even tenor of the culinary ways of a flat. The Professor has now added to the amenities of the electric cookery situation by publishing some more figures "for what they are worth;" the item of greatest proportions in his statement being purely an estimate. Let us suggest with all respect that the figures are not of much value; and, judging from our own experience of incidental household expenses, we should imagine that some of the figures besides the largest one are purely guesswork. If they are not, then we congratulate the Professor on the mathematical accuracy with which his household accounts are kept. The figures are given to show the savings effected since electric cooking has been adopted, as compared with prior coal and occasional gas use. The comparison is as follows:

	Annual Expenditure.		
	Average of Two Years, Oct., 1909-Sept., 1911.		Oct., 1912-Sept., 1913
Coal	£12 16 10	..	£1 18 0
Coke	—	..	3 16 0
Wood	1 8 6	..	1 2 0
Gas	2 8 0	..	—
Oil	0 6 0	..	—
Sweep	0 11 0	..	0 2 6
Electricity—Lighting	7 13 9	..	20 7 5
Heating	—		
Cooking	—		
Regular domestic service, wages	43 4 2	..	22 17 6
Occasional help, wages	1 5 9	..	8 17 4
Total cost of food	122 0 0	..	107 0 0
	£191 14 0	..	£166 0 9

Now we see here a saving of £25 13s. 3d. on the year's outlay. It is interesting to note how this is made up. The cost of food is an estimated item in the first column—the £122 being made up by adding £15 to the £107 to represent the food consumed by one servant, who is now numbered among the unemployed, or is doing some other girl out of a job through being discharged from Professor Morris's service, and so is adversely affecting, in her small part, the national economy. The food of one servant therefore represents £15 of the saving; and so this is not due to the lessened shrinkage of meat, through cooking it in an electric-oven. The net saving in the domestic service and occasional help items is £12 15s. 1d.; so that this item and the £15 above mentioned covers, with a surplus of £2 2s. 10d., the saving that the Professor has effected in his household expenses—according to his figures. And yet all those dainty joints of meat, fowls, turkeys, and so on, have been cooked electrically, and ought of themselves to have shown phenomenal savings in weight. The Professor cannot get away from the figures on which he has chosen to base his case. There is another thing that we personally find; and it is that an additional servant is not only responsible for more being expended on wages, but for an increase in other expenses. Every extra servant makes a difference in the cost of fuel and lighting. On the whole, we are astonished that Professor Morris's household expenses do not show a greater saving than the £12 15s. 1d. on wages and assistance; and the £15 on food, or rather these two amounts less £2 2s. 10d., by which the other costs last year ascended. He does not say if the £20 7s. 5d. for electricity includes renewals.

Price Increases and Lamp Consumptions.

Some electricity undertakings are feeling acutely the additional cost of living in these days—coal and oil prices, of course, being the ugliest features. Some of the concerns, in districts that are not of a character that shows a respectable elasticity in meeting adverse conditions, have made a change in their prices. Among the latest is the Carnarvon undertaking, which is leased from the Corporation by the National Electric Construction Company, Limited, and the other is that of the Bangor Council. The Carnarvon price has gone up 1d. per unit, and the Bangor price by ½d. The Carnarvon Company have fared badly, and have had more kicks than halfpence; so that, in taking over a lease of the concern, they made an unfortunate speculation. In an explanation as to the reason for making the increase in price, they lay the blame on the consumption reducing metallic filament lamp and the price of coal. It was at one time expected that the metallic filament lamp would produce its own compensations; but it has not done so in Carnarvon. There in 1907, nearly 10 units per carbon filament lamp a year were being sold; now the output averages only about 4½ units per lamp. There is no great value in such figures as these; for we do not know the candle power of the lamps, nor do we know whether many lamps have been connected by consumers for purely occasional lighting, nor are we aware whether consumers who have both systems of lighting installed are again burning more gas. They are likely to do so with electrical energy at 6d. per unit. But 4½ units for metallic filaments seems to be about comparable with 10 units for the carbon filament lamp—taking equal candle powers.

SULPHATE OF AMMONIA COMMITTEE.

A MEETING of the Executive Committee of the Sulphate of Ammonia Committee was held at the National Gas Exhibition last Wednesday, and the proceedings occupied two hours. It was followed by a well-attended gathering of sulphate of ammonia makers, at which the violent fluctuations in the price of this article were discussed. It was felt that if a Committee of makers could be formed to inquire carefully into the causes of these fluctuations, and afterwards to meet the chief dealers, and discuss with them in an amicable manner the possibility of devising some scheme of ensuring more stability in prices in future, some basis of transacting business might be evolved which would prove advantageous to both sides. In the afternoon, a meeting of benzol makers was convened, at which a large number of British producers met Herr Sohn, of the German Benzol Syndicate, and discussed with him the possibility of obtaining and circulating accurate statistics relative to the production and consumption of benzol in the chief countries. Colliery proprietors, representatives of coke-oven and gas undertakings, and tar distillers were present in good numbers; the chair being ably filled by Mr. Francis Samuelson, of the well-known Middlesbrough firm.

On Thursday, the International Meeting of Sulphate of Ammonia Manufacturers was held at the exhibition, and was very well attended. Sir Corbet Woodall, D.Sc., M.Inst.C.E., the President of the Exhibition, was in the chair; and interesting papers were read by (among others), Mr. T. Milne, the Chairman of the Sulphate of Ammonia Committee, Mr. W. N. M'Ilravy, from the United States, and Herr E. Sohn, M. A. Lévy, and Mr. W. Kirkpatrick, representing respectively the German, French, and Belgian propaganda bodies. Mr. A. Koning was also present on behalf of the Belgians. Sir Corbet Woodall, Mr. Charles Carpenter, D.Sc., and a number of other British representatives of the industry, addressed the meeting.

THE QUALITY OF LONDON GAS.

Third Quarter of 1913.

WE give below a summary of the results of the official testings of the gas supplied by the three Metropolitan Gas Companies during the third quarter of the present year. The corresponding summary for the second quarter was given in the "JOURNAL" for July 22 last (p. 228). The period referred to as the third quarter of this year is the thirteen weeks ended Sept. 27.

ILLUMINATING POWER.

The average results of the testings of illuminating power with both the No. 2 "Metropolitan" argand burner, and the prescribed flat-flame burner are shown in Table I., which also gives the corresponding figures for the third quarters of the years 1911 and 1912.

TABLE I.—*Averages of All the Testings of Illuminating Power for the Third Quarter of the Year* [*Candles*].

Company.	No 2 "Metropolitan" Argand.			Flat-Flame.		
	1911.	1912.	1913.	1911.	1912.	1913.
Gaslight and Coke	14·92	14·54	14·38	8·70	8·37	8·32
South Metropolitan	15·73	15·44	15·52	10·04	9·35	9·54
Commercial	14·57	14·83	14·54	8·32	8·41	8·39

The results call for little comment, as, beyond a reduction of about half a candle in two years in the average illuminating power of the gas supplied by the Gaslight and Coke Company, there is little change to be observed. The coal gas supplied by the South

Metropolitan Company is about one candle higher in illuminating power than the mixed gas supplied by the other Companies. The minimum returns during the past quarter were, with the argand burner: For the Gaslight and Coke Company, 12·89 candles; for the South Metropolitan Gas Company, 13·70 candles; for the Commercial Gas Company, 13·72 candles. And with the flat-flame burner: For the Gaslight and Coke Company, 6·62 candles; for the South Metropolitan Company, 7·75 candles; for the Commercial Company, 7·42 candles. In each of the thirteen weeks of the quarter, the Gaslight and Coke Company had at least one return of testings with the argand burner below 14 candles, and in five of the weeks the minimum return was at least half a candle, but not one candle, below 14 candles. In one other week there was at least one return below 13 candles. The Company are liable to incur a forfeiture for daily testings not above 13½ candles; but if they are above 13 candles, the average of three consecutive days' testings is taken in computing the value of the gas for the middle of the three days. On the other hand, if the result of a single day's testings is 13 candles or lower, the Company are forthwith liable to incur a forfeiture—subject, of course, to the Chief Gas Examiner being satisfied that the liability should be enforced in the particular case.

Calorific Power.

A summary of the results of the testings of calorific power during the quarter and the corresponding quarters of the two preceding years is given in Table II.

Table II.—*Summary of Testings of Calorific Power (Gross and Net) for the Third Quarter of the Year [Calories per Cubic Foot].*

Company.	Average.			Maximum.			Minimum.		
	1911.	1912.	1913.	1911.	1912.	1913.	1911.	1912.	1913.
Gaslight and Coke—									
Gross	136·6	135·5	136·5	153·4	144·3	144·3	127·8	125·6	127·4
Net	122·2	120·8	121·8	138·0	129·3	129·1	115·5	110·2	114·2
South Metropolitan—									
Gross	143·5	143·1	143·2	160·3	153·1	156·2	133·5	131·7	135·0
Net	128·1	127·4	127·6	144·5	137·7	139·1	119·0	116·6	119·7
Commercial—									
Gross	135·0	135·9	134·0	150·4	149·6	147·3	123·6	126·2	123·1
Net	120·7	121·8	120·3	133·3	134·4	132·7	110·6	112·3	110·7

The results for the past quarter do not differ greatly from those of previous years. The lowest result reported for the Gaslight and Coke Company—114·2 calories net—is above the standard of 112·5 calories with which this Company are required to comply. The other Companies are not subject to any standard of calorific power. As usual, the calorific power of the coal gas supplied by the South Metropolitan Company is about 6 calories per cubic foot higher than that of the mixed gas supplied by the Gaslight and Coke Company.

Sulphur.

The average and maximum figures for the returns of testings for sulphur are shown in Table III. The average is rather lower

Table III.—*Summary of Testings of the Sulphur in London Gas for the Third Quarter of the Year [Grains per 100 Cubic Feet].*

Company.	Average.			Maximum.		
	1911.	1912.	1913.	1911.	1912.	1913.
Gaslight and Coke .	34·1	35·7	34·0	58·5	52·5	49·4
South Metropolitan	27·1	24·3	23·4	49·4	43·0	54·6
Commercial . . .	29·8	30·7	29·1	61 7	42·1	54·7

for all the Companies than in the corresponding quarter of last year. The maximum figures do not call for special comment, as they are in no way abnormal.

Westminster Technical Institute Lectures.

We have received from the Principal of the Westminster Technical Institute (Mr. J. Stuart Ker, B.Sc., Assoc.M.Inst.C.E.), the syllabus of a course of three lectures on "Refractory Materials," to be delivered at the Institute by Dr. Rudolf Lessing, F.C.S., on the 7th, 14th, and 21st prox., at 7.30 p.m. The lecturer will deal (*inter alia*) with the raw materials of refractory products; the manufacture of fire-bricks, blocks, and retorts; kilns, pyrometry, and Seger cones; fire-bricks, gas-retorts, and fire cement; radiants for gas-fires, burner-rings, and rods; and the use of refractories and their treatment in works practice. These lectures are mainly intended for those engaged in the gas industry. They will be followed by another series of three, on "Gaseous Combustion," to be delivered by Mr. L. F. Tooth, of the Commercial Gas Company, on Jan. 30, and Feb. 6 and 13, 1914, at 7.30 p.m. These have been arranged in conjunction with the London and Southern District Junior Gas Association. The special fee for the course of six lectures is 2s. 6d.; but students already in attendance at the Institute will be admitted free.

WORKS TOPICS.—IV.

By Modus Operandi.

It is not long since the disposal of coke was discussed briefly in this column. There is, therefore, no necessity to refer again to the main cause of the difficulty experienced in obtaining reasonable prices for this product. The curtailment in the quantity of water gas now being made is, of course, the reason of the increase in the supply and the consequent reduction in price. The matter is by no means pressing at present, for the price of coke is not low. But owing to the anxiety of all undertakings to make more coal gas and less water gas, it is very desirable that immediate steps be taken to open up new markets for coke wherever possible. We shall then be prepared to weather the storm should it come. Most men who are familiar with the coal and coke market—and one might almost include the man in the street—know that there is a certain demand, and it could certainly be a growing one, for an "improved" coke.

Low-Temperature Coke.

By "improved" coke is meant a product of low-temperature carbonization containing 7 or 8 per cent. of volatile matter, and having sufficient strength to enable it to be handled without suffering breakage. It must be of a consistent quality, and each piece be thoroughly carbonized throughout its bulk at the required temperature. This is mentioned for the reason that the products which have so far been put on the market have been, in some cases, deficient in respect to uniformity. Here we have one of the most difficult problems in this question of low-temperature carbonization. It is obvious, however, to every carbonizer that for this purpose it is useless to attempt to distil the coal in bulk, as in gas-works or coke-oven practice. It must be carried out in a thin layer, so that the low heat employed—about 1000° Fahr.—may penetrate to the centre of each piece in the required time.

The Richards Process.

The low temperature employed for this process enables advantage to be taken of mechanical appliances for conveying the coal through heated vessels, as described in the "Journal" for April 8 last, p. 82. Briefly, the plant consists of a long, rectangular shaped iron vessel heated externally by gaseous firing. Inside this vessel a tray conveyor slowly carries the coal from one end to the other, occupying 2½ hours in its passage over a distance of about 60 feet—the length of the vessel or oven. At one end there is a sealed coal-hopper and mechanical feed, and at the other end a similar arrangement for receiving the coke. The temperature—about 900° Fahr.—maintained in the process is sufficiently low to enable ironwork to withstand the heat without being in any way affected. This has been proved on a trial plant extending over a period of three years.

It appears to the writer that such a process is well designed for its purpose, and should fulfil the required conditions, which are by no means easy of attainment. It is satisfactory to know that a plant to carbonize 70 tons a day is estimated to cost only £2500, and would occupy much less space per ton of coal carbonized than a similar-sized horizontal retort installation. In the latter respect, the process would appear to be on a par with the continuous vertical retort systems, though it must be remembered that quite twice the quantity of coal would require to be carbonized to yield a given quantity of gas. This, again, would put the system on terms of equality with horizontal retorts in regard to space required per 1000 cubic feet per diem.

Suggested Scheme for Gas-Works.

Assuming that gas-works were to adopt such a process, how would this affect the coke question? It would, of course, take a lot of ordinary coke off the market, and put in its place a special coke to oust coal from the domestic grate. The new coke would not compete with the old, but only with coal; for where users could burn ordinary coke to advantage, they would continue to use it owing to its cheaper price. The production of this improved coke would merely open up a new market hitherto filled entirely by coal. The main disadvantage in adopting such a process is that twice the quantity of coal would have to be handled as compared with ordinary gas-works practice, for the make of gas per ton is no more than 6000 cubic feet. This disadvantage would have to be counteracted by the higher sale price of the improved coke, the value of the tar—as a result of its high content of motor spirit, and the maintenance of ordinary coke at a fair price, which should follow the policy of taking a quantity of ordinary coke off the market.

It would be an advantage that the production of a high candle power gas from the coal distilled for this purpose would enable a large quantity of blue gas to be mixed with the rich gas made in the process. In fact, it is probable that equal quantities of blue gas and this rich coal gas would together yield a mixture of the required quality. The manufacture of blue gas, and the consequent utilization of coke, would again obviously assist in maintaining the price of ordinary coke. It is imperative, too, that the fuel used in the low-temperature process should be restricted to ordinary coke; the whole of the improved variety being reserved for sale. Outside producers for heating the retorts or ovens would lend themselves admirably to such a plant. For this purpose, again, ordinary coke would be taken off the market. On these

lines, to summarize the respective advantages and disadvantages, we have:

Advantages.

1.—Ordinary coke would be replaced by "improved" coke.
2.—Ordinary coke would be used for making blue gas.
3.—Ordinary coke would be used as fuel for making the "improved" coke.
4.—The production of motor spirit.

It is unnecessary to point out the beneficial effect of restricting the present production of coke.

Disadvantages.

1.—Output of gas per acre reduced as compared with the latest vertical retort systems.
2.—The cost of coal handling per 1000 cubic feet doubled.

The first named is, however, somewhat doubtful, as, if half the gas made in the new plant is blue gas, it is possible that the advantage in space possessed by water-gas plant may counteract any disadvantage in this respect.

To dip briefly into figures. Assuming a company making all coal gas uses an average of 100 tons coal per diem and makes 12,000 cubic feet of gas per ton, giving a total production of 1,200,000 cubic feet a day. Assuming also, that the 100 tons of coal yield 10 cwt. of coke for sale, it follows that 50 tons of coke must be sold per diem. We will now presuppose that a daily sale can be found for 13 tons of improved coke. Under the new conditions, 20 tons of coal will yield the required quantity of 13 tons of improved coke, and will daily make 120,000 cubic feet of rich coal gas, taking the make per ton at 6000 cubic feet. To this rich gas we add 120,000 cubic feet of blue gas, making 240,000 cubic feet per diem produced by the new combined plant. Subtract 240,000 from 1,200,000, there is left 960,000 cubic feet of ordinary coal gas to be made, which, at 12,000 cubic feet per ton, will require 80 tons of coal per diem. Thus a daily quantity of 40 tons of coke, instead of 50, will be made; but of this, 2 tons will be used to make 120,000 cubic feet of blue gas, and a further quantity of 3 tons will be employed as fuel to carbonize 20 tons of coal in the low-temperature settings. Hence the daily production of ordinary coke will be 35 tons, instead of 50 tons. As to the resulting profit or loss, it is impossible to estimate; but consideration must be given to the fact that in the new plant half the gas (blue) would be produced at 3d. or 4d. per 1000 cubic feet, while the improved coke and tar, with its high content of motor spirit, should go a long way towards counteracting the additional cost of making 120,000 cubic feet of rich gas. Added to this, a daily production of 35 tons of ordinary coke should enable a higher price per ton to be obtained than if 50 tons were made daily for sale.

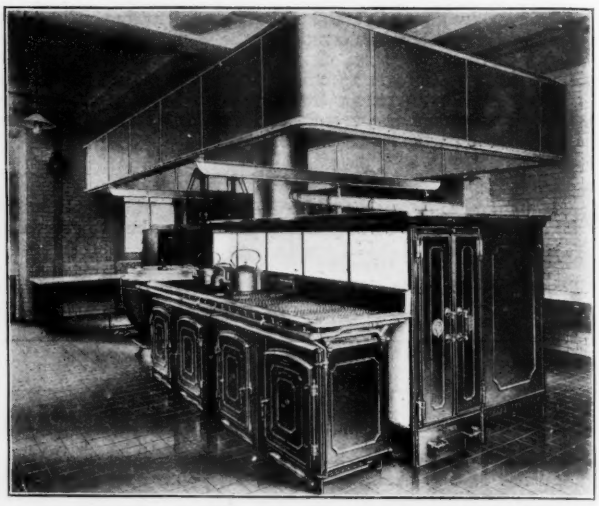
Therefore, in districts where there is not a ready sale for coke, some attention might well be paid to this question, as there would appear to be a likely prospect of good business being done in this direction in the near future. The gas industry at the present time is in so strong a position that it may be thought unnecessary to give any consideration to an entirely new process of this sort. But it would be some advantage were progressive undertakings to adopt a low-temperature system for a small portion of their output of gas. If there is anything to be gained from a process of this sort, the gas industry should be in it. They have the great advantage over all others that the whole of the gas produced is really wanted; while one of the difficulties with outsiders is that a profitable use must be found for the gas. It is not sufficient to put forward the argument: "It has already been tried and found wanting," for the writer contends that hitherto the great mistake of attempting to carbonize the coal in bulk has in each case been made. This must be done in a thin layer.

LARGE COOKING INSTALLATIONS.

GAS-COOKERS are now in favour everywhere (where cooking is required—a reservation it may be well to make, in case readers recall a certain picture that is to be seen in the National Exhibition); and we know that the business of the manufacturers is an ever-growing one. Even so, however, it cannot be every day that a demand arises for an installation capable of cooking for 800 persons—the population of a fair-sized village. This was the requirement of Messrs. Bourne and Hollingsworth (who, it may be explained for the benefit of those living away from London, are drapers in a big way of business in the West-end), for their premises in Oxford Street and in Gower Street. The need has been satisfied in a thoroughly satisfactory manner by the Davis Gas-Stove Company; and in view of the magnitude of the "job," some particulars of the apparatus installed will be of general interest.

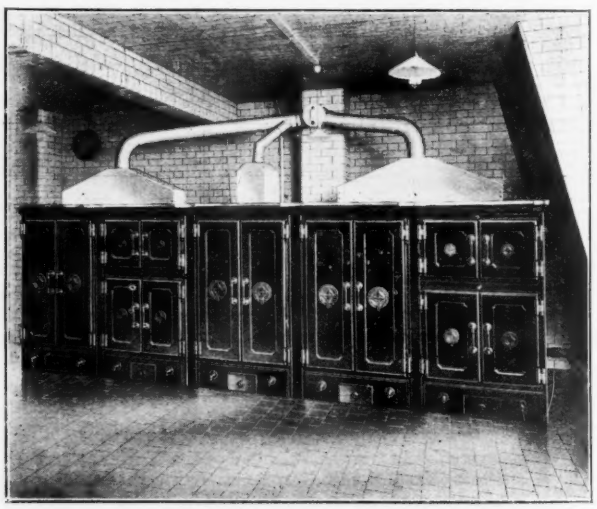
In the kitchen at Oxford Street there is a range of large ovens consisting of three roasters each 4 ft. 6 in. high by 2 ft. 9 in. wide and 2 ft. 6 in. deep inside, and two roasters with bottom compartments each 2 ft. 8 in. high by 2ft. 9 in. wide and 2 ft. 6 in. deep, and top compartments 1 ft. 6 in. high. These are fitted together side by side under a continuous cornice. In addition, there are two "Metropolitan" ranges, each consisting of two ovens, side by side under a continuous top and hotplate. A special fish-fryer, 4 ft. 9 in. wide by 2 ft. 4 in. deep and 2 ft. 8 in. high to the top of the hotplate, is strongly constructed, with heavy cast-iron hotplate skirting and legs, and wrought-iron frame-work. It is provided with two cast-iron pans, each of which is heated by four powerful straight atmospheric burners under separate control. There is a tinned iron cover-plate to fit round the top of the pans, arranged so that splashes of fat, &c., drain back into the pans, and do not run down the outside and cause smoke and smell. Over the fryer is a wrought-iron hood, porcelain enamelled in white inside and out, and a plate-rack. For other operations, there is a griller, 20 inches wide and 15 inches deep inside, with four straight burners, each under separate control. A 20-gallon portable gas-heated boiler is heated by two powerful atmospheric ring-burners under separate control.

Among the fittings in the scullery may first be mentioned a 6-H.P. gas-fired steam boiler, with mild steel plate shell and



A Central Range.

tubular interior. The atmospheric burners are arranged in sections under separate control. An automatic cut-off valve is provided for shutting-down the gas supply when a certain desired steam pressure is obtained. The next thing is a 55 gallon cast-iron steam-jacketed pan; the inner pan being enamelled white inside and outside, and arranged so that every part is exposed to view on raising the cover. A special two-way draw-off cock is fitted, so that either the contents of the pan can be drawn off for use, or waste water can be run off through the drain, according to the direction in which the handle is turned. Next is a range of three steam cooking chests, fitted side by side, each 4 feet high by 1 ft. 6 in. wide and 2 ft. 6 in. deep. They are very strongly constructed; the chambers being made of steel plates well riveted to



A Range of Large Roasters.

angle-iron frames and stayed with angle iron. Davis's patent gun-metal inlet-jet, with dispersing plate and regulating cone, is fitted to each compartment, as well as a combined safety and relief valve, a steam valve with lever handle, and Davis's patent locking-bolt, by which means the door cannot be opened until steam is shut off. Last come two 60-gallon gas-heated boilers, fitted with enamelled cast-iron pans, and with no crevices in which dirt, &c., can accumulate.

At Warwickshire House, Gower Street, the following apparatus has been fitted together to form a central range, with a porcelain enamelled hood above: Two roasters of similar inside dimensions to those first described, and one of the second type mentioned; two "Diamond" ranges, each oven 20½ in. by 20½ in. by 29 in. high,

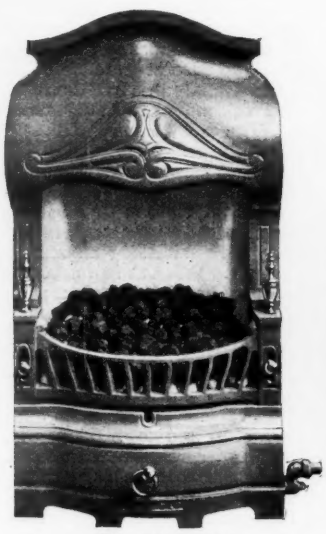
inside measure; two special 60-gallon gas-heated boilers; a hot closet to match the large roasters; and a steam-chest (having one large compartment and three small compartments arranged one above the other), with a specially designed copper boiler fitted beneath the compartments, tinned inside, and constructed so that steam is rapidly generated. There is a steam-supply pipe to each half of the apparatus, arranged so that either can be heated independently; and a feed cistern is installed for water supply.

MAIN GAS-FIRES.

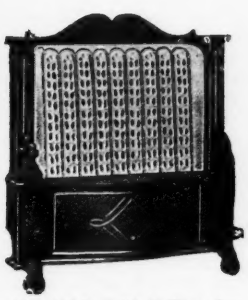
Some New Patterns.

An outstanding feature of recent seasons has been the introduction of fitments for converting coal-grates into gas-fires. One of the most successful of these is the unique "St. Nicholas" interior fitting, which, while satisfactorily performing the primary function of conversion, also retains the genial glow and sentimental associations of the coal-grate. The "St. Nicholas" is an efficient gas-fire, which becomes an integral part of the grate into which it is fitted, and which, at the same times, does not offend the most æsthetic susceptibilities. Its sales have been phenomenal, and its value in bringing gas as a means of heating into the homes of the more conservative or prejudiced section of the British public cannot be over-estimated. In response to many demands, the scope of the "St. Nicholas" has been extended. It is now to be had as an independent fire—the "St. Felix," which can be fitted in the same way as an ordinary gas-fire. The "St. Hilary" embodies the same features as the "St. Nicholas," but has been specially designed for use in "well" grates. The "St. Valentine" is the same as the "St. Nicholas," except that it varies in the outward design. The "Santa Claus" is also the same, but is self-setting. A development of the "Santa Claus" is the "Onward," which has been designed to fit in front of the grate and entirely conceal the grate opening. The "Adaptable" performs the same function as the "St. Nicholas," but is fitted with ordinary upright columnar fuel, as used in modern shallow gas-fires. The "Adaptable" is also to be had in a modified form, so as to suit low grates. The "Forward" is a development of the "Adaptable," and entirely conceals the grate opening.

Turning to the modern type of shallow fire, gas undertakings have shown their appreciation of the well-known "D.S.O." series

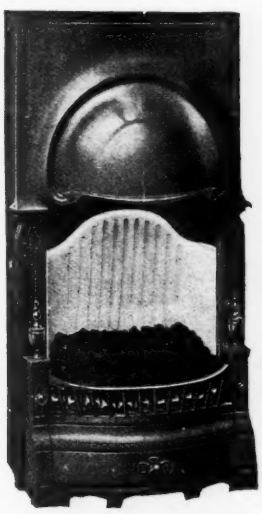


The "St. Felix."

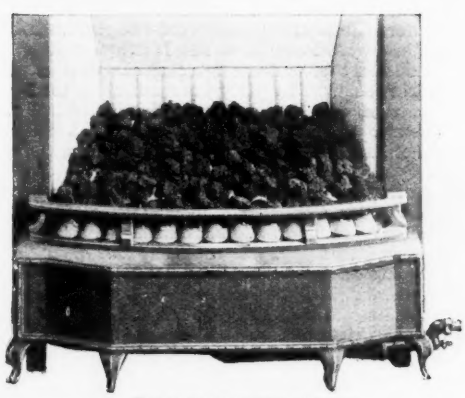


The "Adaptable" Fire, for Low Grates.

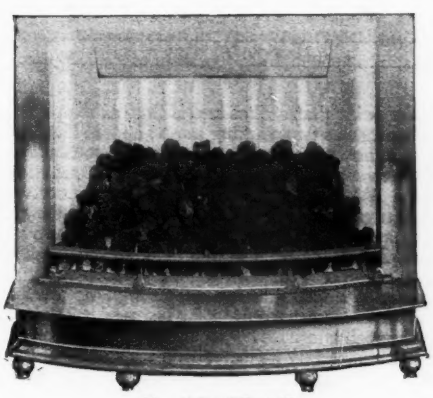
The "Forward."



The "Onward."



The "St. Valentine."



The "St. Hilary."

by the ever-increasing numbers which they order, which in its turn shows the favourable verdict of the public. In view of this substantiation of their claims for their "D.S.O." gas-fires, Messrs. Main are again giving this series much prominence in the present season's lines. They have added another size to the series—an 8-inch—so that there are eighteen fires, three of each design, round, square, and nursery pattern, nominal sizes 7, 8, 10, 12, 14, and 16 inch. As usual, they are embodying still further refinements, which will enable this series to retain its high position among modern shallow fires. Messrs. Main are to be congratulated on their foresight in designing this series of fires so that modifications could easily be made and new features congruously embodied. The "D.S.O." series, it is claimed, effect the complete discharge of the products of combustion through the flue-vent, without the assistance of any flue attachment. In view of the present seeming impossibility of those interested coming to an agreement as to what are the actual working conditions to which fires will be subjected, and the consequent controversy as to what allowance (if any) should be made for flue pipes and chimney-draughts, this fact should satisfy the most cautious of men. A new back-brick is fitted, which still further increases the radiating efficiency of the fires. As hitherto, the fires can be fitted with Main's patent duplex tap. Equal pressure is obtained with this tap, whether the whole or only half the burner is being used.

The fuel or radiant is as last season—*i.e.*, it reaches from the burner to the canopy. This type of fuel the firm have found to give greater efficiency than the shorter type which still persists in some quarters. They say:

> The fact that it is found necessary to place pieces of fuel horizontally across the tops of the shorter fuel is an admission that this latter type of fuel is insufficient in itself to give the maximum efficiency. Of course, it may be claimed that the horizontal pieces are merely for giving a more finished appearance to the fire, and for reducing the ugly gap between the top of the fuel and the canopy. In either case, it would surely be better to lengthen the fuel; from the maintenance point of view, it most certainly would.

In addition to their great efficiency, the "D.S.O." fires have the advantage of simplicity. Parts have been reduced to a minimum, and they can be fitted or removed without the use of any screws or fastenings, which fact implies perfect interchangeability. Practically the only maintenance expense is the fuel, which, while of radiant appearance and great efficiency, is very strong. It leans back off the perpendicular, and cannot fall out. The fires them-

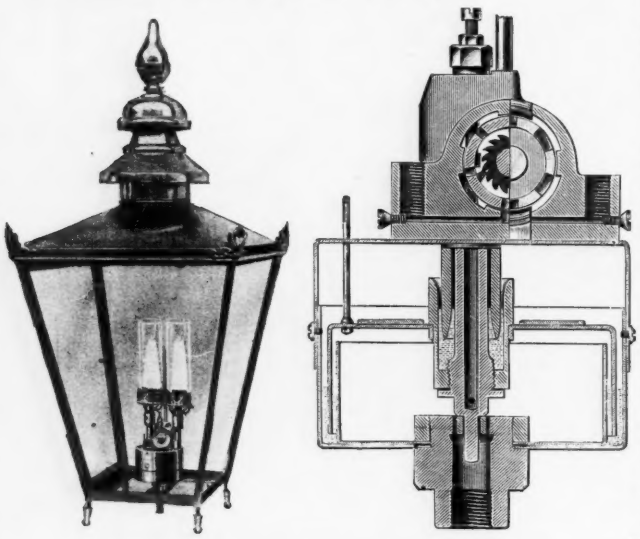
selves are easily cleaned and regulated, and are altogether an ideal series for hiring purposes.

The "St. Magnus" and "St. Mungo" gas-heated steam-radiators are also to be mentioned. These radiators are fitted with an automatic gas-regulator, which experience has proved to be absolutely reliable at all pressures. Metal-to-metal joints are used, to the exclusion of perishable packing of any kind.

It will be seen that Messrs. Main are well equipped for the winter season, which they feel has every prospect of being even better than the last.

LONDON GAS-CONTROLLER.

AMONG the exhibits in the street-lighting section at the National Gas Exhibition is the London gas-controller, which has the distinctive title of the "L.G.C." It is worth examining, as, in such a new business as the distant control of public lamps, with a large field awaiting occupation, the controllers that offer most in the way of simplicity and efficiency are the ones that will survive in the struggle for supremacy. The patent number of the "L.G.C." is 29,249, of 1911;* and it is of the wave-pressure type for securing the igniting and extinguishing of street gas-lamps.



The Controller Fitted Inside Lantern; also a Section.
[It can also be fitted in the frog, or other convenient place.]

The very first point that strikes one is that of simplicity. The controller only contains two working parts; and, in fact, the design and action are in no way complicated—so little so that reliability promises to be a very positive factor in the commendation of the new controller. All the parts are made in non-corrosive metal, and are interchangeable; and in case of accident, they can be easily replaced and adjusted by even a labourer, where a skilled man is not readily available. The controller is a duplex wave one, working at 7-10ths of an inch pressure above the maximum or minimum. It is applicable for either high or low pressure burners, single or in clusters, upright or inverted. It can also be adjusted to extinguish alternate lights if required. We are assured too that it is not affected by weather, wind-storms, or traffic vibration, and that it is dust-proof. All parts move quite freely, are easily accessible, and can be examined and replaced in a few seconds by simply unscrewing a brass cap, which discloses all the working parts to view.

Among other good features are these: The controller is positive in operation, and all gas-ways are directly accessible. It is very compact, and is quite easy to fix—the device going neatly into the frog of a standard, or in the lamp itself, or against the supply-pipe of a suspended inverted lamp. A simple trip action is embodied, whereby each controller can be made to synchronize when being fixed. A thumb-screw is also provided for regulating the bye-pass—thus avoiding the necessity for using a screw-driver. Lights can be lit singly or in a cluster, or both, or alternately by the same controller, and extinguished at will from the gas-works or district governor house. Thus it can be utilized in the daytime in case of fogs.

The several working parts of the appliance are as follows: There is a float actuated by the wave pressure. A spindle with pawl raised by the float operates the ratchet wheel attached to the drum. The drum is drilled and slotted to (1) on first wave, open first gas-way to single light, or cluster lights. (2) On second wave, to close gas-way to cluster light or lights, as desired, or alternate single lights. (3) On third wave, to close both gas-ways and extinguish any remaining lights. There are weights for regulating the wave-pressure, according to the situation or elevation of the lamp, a mercury bath for the float; and a top mercury seal round the hollow stem. A screw is provided for regulating the throw of the spindle. Completing the structure, a bye-pass tube, a bye-pass thumb screw at back, screws to give access to gas-ways, lock-nut to adjust screw, and a composition washer to make a gas-tight junction of the top-chamber and the casing.

* An illustrated abstract of the patent specification appeared in the "JOURNAL" for Dec. 24 last, p. 977.

SCOTTISH JUNIOR GAS ASSOCIATION.

EASTERN DISTRICT.

Visit to the Blairhall Colliery.

THE members of the Eastern District Division of the Scottish Junior Gas Association visited on Saturday the large colliery at Blairhall of the Coltness Iron and Coal Company, Limited. Unfortunately, owing to illness and other causes, the attendance was not so large as anticipated. The President (Mr. W. Geddes, of Granton) was one of those who were absent, as he had not recovered from the indisposition which prevented him from presiding at the opening meeting. The Fife members of the Association were depended upon to increase the number of the party; but they did not attend. Among those present were Mr. R. B. Chalmers (North Berwick), the Vice-President, Mr. Alexander Bishop (Newton Grange), the ex-President, and Mr. Lawrence Farquhar (Alloa), the Secretary. The members were met by Mr. Gilbert Morrison, the Manager of the colliery.

At the Blairhall Colliery, the last word in mining equipment is to be seen. Employment is at present given to about 600 persons; but when the colliery is developed, this number will be at least doubled. In order to accommodate all the workers and their families, the Coltness Company are establishing an entirely new village of something like 400 houses. When the lower seams are being worked, the pit will be about 330 fathoms deep; the greatest depth of one colliery in Scotland.

Mr. Morrison, Mr. Donald Torrie, the Engineer, Mr. William Hunter, the Electrician, and Mr. Alex. Hogg, one of the overmen, conducted the party. They were first taken to the engine-house, where an engine of some 1500 H.P. aroused considerable interest. Fitted with Robey drop-valve gear, the engine is built for the conveyance of heavy weights up and down the shafts. Mr. Morrison explained the working of a recently introduced apparatus for preventing overwinding and the resulting damage to property and frequent loss of life. The party afterwards proceeded to the lamp-room, where they saw the safety lamps, which are fitted with a magnetic lock that can only be opened in the room. In this way the possibility of danger from explosion underground is reduced to a minimum.

The visitors subsequently descended two of the shafts. At one of them they were lowered to the Hartley coal, or three-feet seam, which is not worked at other collieries in Fife. It is a fine gas-producing coal. The party were not taken to the face; but their inspection was both interesting and instructive. Opportunity was also taken to inspect the pumps. Ascending to the surface, the members had explained to them the working of the washers.

After the inspection, the visitors were hospitably entertained by the Company. Mr. Chalmers, in moving votes of thanks to them and to Mr. Morrison and the other officials, said that all they had seen was most interesting. He could say that the colliery was the most up-to-date one he had ever inspected. The vote having been heartily accorded, Mr. Morrison said it had been a very great pleasure to him and the other officials to have members of the Junior Gas Association there; and he could only thank them for their hearty vote.

Midland Association of Gas Engineers.—The Hon. Secretary of the Association informs us that at the autumn meeting, which will be held in Birmingham on the 6th prox., two papers will be submitted—one by Mr. C. H. Webb, M.Sc., of Stourbridge, on "Prepared Tar for Roads;" and the other by Mr. W. M. Valon, of Stafford, on "Gas Supply to Outlying Villages." A report will be presented from the Special Committee on the proposed Commercial Section. The officers and committee for the ensuing year will be elected.

Manchester District Institution of Gas Engineers.—We learn from the Hon. Secretary (Mr. W. Whatmough, of Heywood) that the 168th quarterly meeting of the Institution will be held at Barnsley next Saturday, when, by the courtesy of the Directors of the Old Silkstone Collieries, Limited, the members will visit their Barugh works, for the purpose of inspecting the plant for washing and screening coal, the recovery of bye-products from the coke-ovens, and the distillation of tar and the production of benzol. The business meeting will be held in the afternoon, under the presidency of Mr. J. C. Belton, of Chester, in the Miners' Conference Hall; and it will consist of the introduction of seven new members, and the reading of a paper on "Caring for the Consumer," by Mr. F. D. Richmond, of Heckmondwike. Later in the day, the members will be entertained at dinner by the Directors of the Barnsley Gas Company.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

The B.C.G.A. Cinematograph Film.

SIR,—Gas directors and officials coming to London for the purpose of visiting the Gas Exhibition will learn with much interest that a cinematograph film illustrating the mining of coal and the manufacture and applications of gas which has been prepared for the British Commercial Gas Association, through the kind offices of the Newcastle-upon-Tyne and Gateshead Gas Company, will be shown at the King's Hall Picture Theatre, Uxbridge Road, adjacent to the Exhibition, on Monday, Tuesday, and Wednesday of next week—that is, from the 27th to the 29th inclusive.

The Association would be glad to receive, from gas men who take the opportunity of seeing this film, any critisims or suggestions which they have to make in regard to it.

F. W. GOODENOUGH,
Chairman of the B.C.G.A. Executive.

Horseferry Road, S.W., Oct. 23, 1913.

Somerset and Gloucester Gaslight Company's Prospectus.

SIR,—With reference to the prospectus issued by "the Somerset and Gloucester Gaslight and Coke Company, Limited," the whole of their proposed district, with the exception of Kelston, is comprised in our area of supply. We have given them notice that, should they encroach upon our limits, we shall at once apply for an injunction against them.

Bristol Gas Company, Oct. 20, 1913. JOHN PHILLIPS, Secretary.

Corrosion of Steel Water-Mains.

SIR,—We notice on pp. 243-4 of the last number of the "JOURNAL" some criticisms on our statements regarding the Coolgardie water-main which call for some remark.

In the first place, "Water Engineer" is quite in error in the inference he appears to draw from the report that the tubes were furnished with a protective wrapping of any kind. The allusion to the deterioration of the protective covering obviously refers to the coating, and as such it goes to bear out our contention that, having regard to the extremely corrosive nature of the soil, the tubes were inadequately protected. We would refer "Water Engineer" to a memorandum published by the Goldfields Water Supply Administration, Perth, 1910, according to which these tubes are nothing but thin plates bent up and held together by lock-bars and asphalted, not jute covered,

As regards the question raised by "Water Engineer" and the Holwell Iron Company of internal corrosion, there was no rusting through from the inside. There certainly was internal corrosion; but the report quoted by your correspondents, and published in the technical press some time back, makes it clear that this was due to the conditions under which the main was working (particularly as to air in the pipes), and there is little doubt that the result would have been the same with cast-iron pipes. Even were it otherwise, we would point out that the tubes were made of an entirely different steel to that we use for our tubes; and that the conclusions drawn by your correspondents are not those of the responsible engineers is proved by the fact, already noticed, that Mannesmann tubes are to be used for the portions to be replaced.

We could, on our part, instance many cases of premature decay of cast-iron pipes; but we do not think any good purpose would be served by doing so, as these matters really prove little else than that the life of a main is more than anything dependent on the conditions of its use, the nature of the soil and water, and the protection given. No comparison of any real value can be made except where steel and cast-iron pipes are in use under equal conditions and for an equal period—as, for instance, in the same main or side by side; and in this connection we have quite recently had brought to our notice such a case of parallel use, in which the result was decidedly in favour of our tubes.

BRITISH MANNESMANN TUBE COMPANY, LIMITED.
per J. T. ALLINGHAM.

Salisbury House, E.C., Oct. 23, 1913.

Manchester and Smoke Abatement.

The annual report of the Manchester Branch of the Smoke Abatement League draws attention once more to an urgent matter, and some of the calculations made put the case in a very forcible manner. For instance, there are now in use in Manchester over 100,000 gas-stoves. They are preventing the discharge of something like 10 tons of soot a day into the atmosphere. The price of gas has recently been reduced from 2s. 3d. to 2s. per 1000 cubic feet, if the bill be paid in good time; and it is pointed out that it might be nearer 1s. 6d. than 2s., but that the Gas Committee have to contribute £50,000 a year in relief of rates. The League regard this as a tax on those Manchester citizens who are public-spirited enough—or sensible enough—to cook by gas instead of coal. In the annual report figures are given for two manufacturing firms, one of which has a bad chimney and the other a good one. The firm with the bad chimney uses 60 tons of coal a week at 13s. a ton to produce a given result. The firm with the good chimney gets the same result with 30 tons of coal at 11s. The engines are the same in both cases; but the firm with the bad chimney pays £39 a week for coal and the firm with a good one £16 10s. The work of the smoke inspectors is being helped by the extended use of gas-engines and electricity. There are now in use in Manchester 1439 gas-engines, consuming 400 million cubic feet of gas—12 million feet more than last year. The School of Technology gives lectures to engineers and stokers; for bad stoking is one of the principal causes of black smoke.

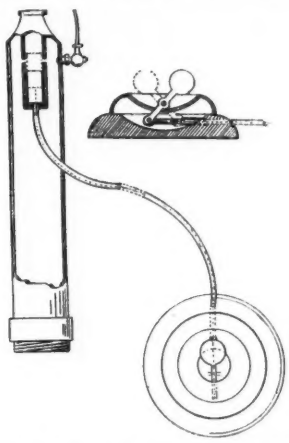
REGISTER OF PATENTS.

Lighting and Extinguishing Gas-Burners from a Distance.

HILL, J. H., and BUCKLE, H., of York.

No. 27,779; Dec. 3, 1912.

This apparatus for lighting and extinguishing gas-burners from a distance is of the kind in which a switch is secured to an operating wire passing through a guide-tube and connected, either directly or indirectly, to a gas cock or valve. In some arrangements of this kind, the closing of the cock is by the act of a spring; but according to the present invention, the wire is so fitted in a non-flexible guide tube that it is free to move only backwards and forwards in the tube, and consequently it is possible to both open and close the valve at a distance by operating the wire by means of a pull-and-push device.



Hill and Buckle's Gas-Lighting Switch.

As shown, the pull-and-push device actuates a wire, rod, or cable, so arranged as to convey the necessary dynamic force to open and close a gas-valve tap with a bye-pass light to which the gas-burner is attached. Firmly fixed to the device is one end of a metal rod, or wire, enclosed within a fixed non-flexible guiding tube of such diameter that the wire is free only to move backwards and forwards in the tube. At the other end, the wire is attached to a gas-tap of any suitable kind, with a plunger (vertical or horizontal), or with a plug or flap. The special valve (as shown) is preferred with a piston or plunger operated by a wire or cable direct, and inserted in the gas-supply pipe, and with a bye-pass gas connection, so that, when the valve is turned on, the burner will light. By this means the gas is both turned on and off by the backward and forward movements of the switch lever and the wire.

Automatically Testing and Sampling Liquids.

LAMPREY, R. H. B. & P. C., of Blackheath and Lee, S.E., and the SOUTH METROPOLITAN GAS COMPANY.

No. 21,313; Sept. 19, 1912.

This invention has reference to apparatus for testing and sampling liquids automatically, and may be used in connection with liquids of various descriptions. That described in the specification with reference to the accompanying illustration is such as would be employed for testing and sampling ammoniacal liquor waste. It might require modification in detail to enable it to deal with other kinds of liquid.

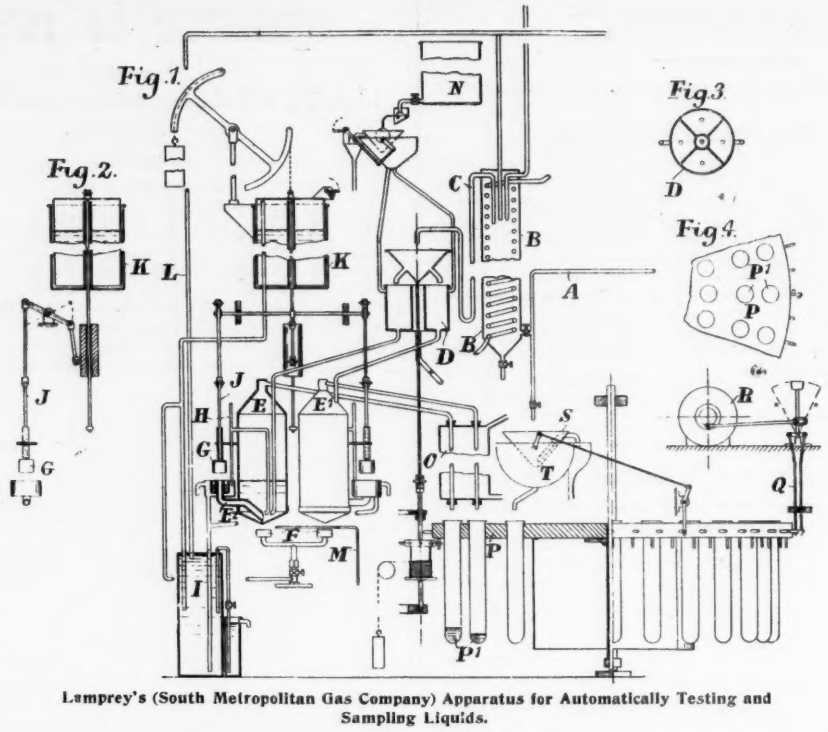
Fig. 1, p. 360, shows the apparatus (diagrammatically) in elevation and partly in section; and figs. 2, 3, and 4 are details.

The liquor to be tested, entering by the pipe A, passes into the cooler B, which is furnished with a water-coil and has a sludge drain at the bottom. There is a branch from the gas supply pipe and a vent by means of which the gas supply may be diverted should the flow of liquor to be tested temporarily cease. C is an outlet for liquor near the top of the cooler, delivering into a funnel which rotates and directs the liquor, by means of its divergent outlets, into the required compartments of the fixed distributing box D. The funnel is mounted on the summit of a vertical shaft, fitted in suitable bearings, and given a tendency to rotate by means of a drum cord and weight.

As will be seen from fig. 3, the box D has four compartments, two of which lead respectively to boilers E E^1 and two to waste. These boilers, heated by gas-burners F, operate for the measurement and distillation of the liquor introduced into them. Two boilers or distilling chambers are indicated, but the fittings and connections of both are not fully shown. Any number of boilers may be employed; but the following description is confined to only one.

The liquor which enters the boiler is able to escape by the pipe E^2, except when the outer end of it is closed by the cap G, which dips into a mercury seal. There is also another outlet from the boiler by means of the secondary overflow pipe H, which delivers into an annular trough surrounding the mercury seal, but only operates as will be explained later on. The trough delivers into the closed vessel I, which discharges down to a certain level by a syphon leading to a sealing vessel.

The cup G of the mercury seal is suspended from a rod J hanging from a crank arm fixed on a rock shaft (see fig. 2). On the opposite side of the shaft is a crank arm which is coupled by a rod and sliding



Lamprey's (South Metropolitan Gas Company) Apparatus for Automatically Testing and Sampling Liquids.

weight to the rod of the gasholder K, the movable part of which is balanced by weights. Gas for the burners F is admitted to the holder through the vessel I. L is a gas-pipe leading to the vessel I, and communicating with the interior of it near the top. From the pipe L extends a branch which diverts the gas from the burners should the flow of liquor temporarily cease. There is also a pipe which leads gas from the vessel I to the holder K, and extends some distance down into the vessel. M are pilot lights for the burners F constantly burning.

Besides the necessary pipe extensions and connections for a double set of boilers (as indicated but which are not described), the apparatus includes the following parts. N is a receptacle for the reagent—caustic soda solution if ammonical liquor waste is being tested. The receptacle delivers, by means of a ball valve, into a measuring vessel, which is tipped periodically into a funnel communicating with the chambers of the distributing box D, which discharge into the boilers. O is a condenser for the distillate passing off from the boilers. From the condenser the distillate drops into tubes P^1 in a table P, which is capable of being rotated by spurs on a drum engaging with pins on the circumference of the table. The rotation of the table is controlled by an escapement Q, operated by clockwork R, and engaging with circumferential pins similar to those before mentioned. An additional set of tubes is provided in the table for the reception of measured quantities of the liquor from the tipping vessel S, which receives the liquor from the inlet pipe and delivers to the funnel T, which discharges over the tubes.

The fragmentary plan view (fig. 4) shows the arrangement of the tubes in the table P.

The arrangement of the moving parts is such that all are appropriately timed next to co-operate in the manner explained. When the parts are in the position shown, the waste liquor passes through the cooler B and box D to the boilers, and thence to the vessel I, whence it escapes by the syphon shown. At the proper time, however (as when the clockwork escapement operates), the drum rotates the funnel and diverts the discharge of the liquor from the boilers to waste. The boilers then empty down to the level of the seal, leaving, however, a measured quantity of liquor to be tested. When the overflow from the boiler ceases, the syphon of the vessel I continues to run, thereby uncovering the end of the gas outlet pipe. The gas, therefore, which enters the vessel I by the pipe L can now pass to the gasholder K. The gas entering the holder lifts it, and the latter (by the stop on the end of the rod) lifts the weight and, by means of the mechanism shown in fig. 2, closes the mercury seal. A further movement of the gasholder tips the vessel, which discharges a measured quantity of reagent into the boiler. The opening of the gas outlet likewise gives a supply of gas to the burners F, which are immediately ignited by the pilot jets.

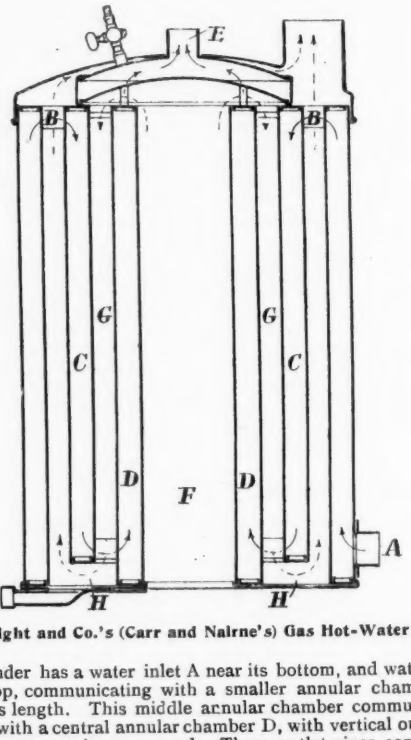
The distillation now proceeds, and the distillate finds its way by the condenser O to the tubes P^1 until the clockwork again operates and opens the boilers to the waste liquor by the rotation of the funnel. The liquor now runs through the boilers by the pipe H. This has the effect of cutting off the gas in the vessel I and allowing the holder to land and the other parts to resume their previous positions. The tubes P^1 may be supplied with testing liquid either before or after receiving the distillate. The charge will then indicate by its appearance or characteristic action the condition of the sample.

Gas Water-Heater.

ALEXANDER WRIGHT AND CO., LIMITED, of Artillery Row, Westminster, and CARR, H. O., and NAIRNE, U. O. S., of Wandsworth.

No. 22,095; Sept. 28, 1912. No. 7412; March 28, 1913.

This apparatus consists essentially of a cylinder which may be used in series with the flow-and-return pipes of a water-circulating system, with arrangements whereby the fuel employed is burned under the cylinder, so that, by the interchange of heat, the cylinder becomes a circulator; the products pass upwards at practically atmospheric temperature; and the condensible products fall from an outer annular chamber in such a way that they cannot possibly fall upon the burner used for the combustion of the fuel, but are collected after having scoured the non-condensible products and extracted from them a large proportion of the constituents which are capable of solution in the water.



Alex. Wright and Co.'s (Carr and Nairne's) Gas Hot-Water Heater.

The cylinder has a water inlet A near its bottom, and water outlets B at its top, communicating with a smaller annular chamber C of slightly less length. This middle annular chamber communicates at its bottom with a central annular chamber D, with vertical outlet pipes for the hot water at its upper end. These outlet pipes communicate with a flat or slightly concave chamber, on the top of which is the hot-water outlet E. The fuel is burned under the central flue F of the central annular chamber; and the heated products, striking the concave outlet chamber above, become cooler and pass down the flue G formed by the space between the central and middle chambers. They are then forced through the passages H into and upwards through the space between the middle and outer chambers; and "though they are by this time practically cold, they are forced upwards by the ascensive impulse given to them by the hot products in the central flue which have a greater upward tendency than the cold products can overcome. The inner surface of the outer annular chamber is practically cold; and the steam which is contained in the products of all fuels containing hydrogen is thereby condensed and washes down with

it a proportion of the soluble gases contained in the products—such as sulphur dioxide—which gases are injurious and noxious if allowed to escape into the atmosphere. In this way the full heat value of the fuel reckoned on the gross or higher basis is absorbed into the water, and the products which condense or are absorbed are collected from a spout attached to a chamber underneath the outer annular flue spaces."

If the heater acts as a circulator fed from the cistern of a circulating hot-water system, the cold water flowing to it from the cistern becomes warm at a point which coincides with the complete heating of all the water in the cistern, which is effected in a downward direction. The patentees therefore may use a thermostat to shut off the fuel supply when the inlet water attains a certain temperature, or rely upon the user of the heater turning off the fuel supply when the cold water inlet has become warm. Should this be neglected, they say, the only result will be a lowering in the efficiency of the heater due to the fact that, as the inlet water becomes warm, the temperature at which the products pass away will also become higher, and the amount absorbed by the circulating water will become proportionately less. The apparatus may also be used as a geyser, by connecting the ordinary water supply of a house to the inlet, and forcing the water through the apparatus at any required rate, when the heated water can be led from the outlet to any desired place for use.

APPLICATIONS FOR LETTERS PATENT.

23,040.—Barnes, J., "Gas-taps." Oct. 13.
23,049.—Fletcher, F. M., "Generating the products of combustion." Oct. 13.
23,186.—Price, H. A., and Turner, H. C., "Fumigating by gas." Oct. 14.
23,211.—Hathaway, C. S., "Burners for heating and lighting." Oct. 14.
23,221.—Estall, E. A., "Water-meters." Oct. 14.
23,240.—Lamkin, A. E., and Mead, F., "Gas lighting." Oct. 14.
23,259.—Baudains, H. L., "Operating gas-cocks." Oct. 14.
23,340.—Marconi's Wireless Telegraph Co., Ltd., and Ryan, C. P., "Operating gas-valves from a distance." Oct. 15.
23,343.—Chippendale, H. A., and Kimmell, M., "Gas-burners." Oct. 15.
23,350.—Ionides, A. C., jun., "Mixing the constituents of a combustible gaseous mixture." Oct. 15.
23,365.—Robinson, S., "Pneumatic gas lighting." Oct. 16.
23,388.—Taylor, W. P., and Willis, J., "Vibration damper." Oct. 16.
23,407.—Fletcher, Russell, and Co., Ltd., and Fletcher, T.W., "Atmospheric burners." Oct. 16.
23,414.—Milne, J., and Son, Ltd., and Fox, T., "Stop-mechanism for gas-meters." Oct. 16.
23,415.—Kirke, P. St. G., and Bonecourt Surface Combustion, Ltd., "Combustion of combustible mixtures." Oct. 16.
23,418.—Hughes, T., "Distillation of coal." Oct. 16.
23,446.—Twigg, W. R., and Williams, D., "Gas-heated radiators." Oct. 16.
23,461-2.—Clayton, T., "Incandescent burners." Oct. 16.
23,555.—Berlin-Anhaltische Maschinenbau Akt.-Ges., "Quenching coke." Oct. 17.
23,665.—Jackson, T., "Gas flashing apparatus." Oct. 18.

More Water-Divining Trials in Prospect.

It will probably be remembered that in April last there were carried out at Guildford, under the auspices of the "Sanitary Record," a number of elaborate and scientifically devised tests to ascertain how far the claims set up by water diviners could be substantiated. The conclusions arrived at by the Committee were that the diviners failed to carry conviction; that no two of the six diviners agreed as to water being obtainable at any one spot; and that the so-called "gift" is not an "art" or a "science." It appears that trials have also been recently conducted in France with similar unsuccessful results. But our contemporary says a further trial is promised if what is described as "the champion diviner" of France will consent to it, and that is to discover the whereabouts of "a movable water-pipe which can be placed in any direction under an artificial floor." He will also be expected to decide whether the pipe is full or empty, and, if full, which way the water is running. Our contemporary is not sanguine enough to believe that any credit will accrue to those who organize such trials, "for, on however impartial and scientific lines a test or tests be arranged, the reply of the diviners is invariably that they have been misled or unfairly treated or else led into a trap, for their attempts to divine water when under the supervision of a committee of scientists result in failure. And however pronounced this may be, there are and will, it may safely be asserted, continue to be, numbers of credulous people who believe in diviners, chiefly because they claim to have occult powers, however worthless such may be."

Water Supply of Vancouver (B.C.).—The water supply for Vancouver has to be brought from mountain slopes on the opposite shore across the Burrard inlet. There are 16 submerged mains 12 to 18 inches diameter now in service. The last—an 18-inch pipe—was laid on July 25 across the Second Narrows, a point where at low tide the water had a maximum depth of 75 feet, the distance from shore to shore being rather less than 1000 feet. The pipe, fitted with flexible joints, was assembled on one shore on a wooden shoot, and the under-water length of about 1000 feet was hauled across by tackle and a donkey engine on the other side. Four 1½-inch cables were attached to the pipe, all equalized through pulley-blocks, so that the strain came equally at four points in the length. Air under 40 lbs. pressure was maintained in the pipe during the laying. The pipe was made up of 9 feet lengths, and was finally tested to 210 lbs. pressure after assembling.

LEGAL INTELLIGENCE.

ALLEGED NUISANCE FROM A WELSH GAS-WORKS.

HIGH COURT OF JUSTICE—CHANCERY DIVISION.

Tuesday, Oct. 14.

(*Before Mr. Justice* Joyce.)

Wood v. Mayor and Corporation of Conway.

This was an action brought by Mr. Albert Wood against the defendant Corporation for an injunction and damages in respect of an alleged nuisance caused by them in the manufacture of gas.

Mr. Cunliffe, K.C., and Mr. Tomlin appeared for the plaintiff; while Mr. Hughes, K.C., and Mr. Owen Thompson represented the defendants.

Mr. Cunliffe, in opening the case, stated that the gas-works which adjoined the plaintiff's premises were alleged to be a source of serious nuisance. Conway was a very picturesque place in North Wales, and there was nothing in the neighbourhood of the gas-works but rustic surroundings. The plaintiff, who was seventy-six years of age, was a man of considerable eminence in the district, having been Mayor of Conway for a number of years—in fact he was the largest individual ratepayer; so that, if the gas-works had to be put in proper order, he would have to bear a large share of the burden. This was the second time that an action had been commenced against the Corporation in respect of a nuisance; the first, which was settled upon terms, having been brought in 1899. The works had been carried on by the Corporation since 1880, when a Provisional Order was obtained, authorizing their purchase from the Conway Gas Company. In section 5, it was set forth that the provisions of certain Acts should be incorporated with the Order; the material ones being those contained in the Gas-Works Clauses Act, 1847. Section 29 of this Act provided that nothing in it or in the Special Act should prevent the undertakers from being liable to an indictment for nuisance in consequence of making or supplying gas; and section 9 of the Gas-Works Clauses Act of 1871 enacted that nothing should exonerate the undertakers from any action for nuisance in the event of one being caused by them. Consequently it was impossible for defendants to plead that the Acts justified them in causing a nuisance, as they had no statutory right to do so. The works had increased at an alarming rate in recent years; and certainly since 1900 the defendants had known that the site was totally inadequate. From 1880, the defendants had been repeatedly told that this was so, and that the works required improvement. In consequence of the complaints made in 1900, they called in Mr. Thomas Newbigging, who, after inspecting the works, condemned them in most unmistakable language. He suggested that the proper policy to adopt was to select a new site, and erect thereon new works with the best modern appliances. He went on to state that the defendants had an excellent district in which to extend the consumption of gas, as only about one-third of the population was being supplied, and there was every prospect of it increasing. In face of this advice, the defendants had gone on extending the works upon an inadequate site, though they had other land upon which they could have erected new ones. In 1902, the plaintiff put up a small plantation of trees so as to screen his property from the surroundings; and these trees had been considerably injured by the gas fumes. Originally the retort-house, from which a great deal of the nuisance came, was on the westerly side of the works; but later it was removed to the easterly side, with openings right upon the plaintiff's land, with the result that gas fumes were discharged on to it. In 1904, the Borough Surveyor reported to the Corporation that a new governor and governor-house were required; but nothing was done. In 1905, the plaintiff's attention was called to the fact that his trees were suffering damage from the gas fumes; and as his complaints were not attended to, he issued a writ in the King's Bench Division, claiming damages in respect of the nuisance. Thereupon negotiations took place with a view to a settlement; and, among other things, the defendants suggested that different trees should be planted, though they omitted to state that Professor Storey had reported to them that the primary cause of the whole mischief was the gas fumes. In May, 1909, the defendants got a further Act for the supply of gas; and a report was afterwards obtained from Mr. William Newbigging, who made certain suggestions with a view to mitigating the nuisance. In October, the Corporation entered into an agreement with Mr. Wood for the settlement of the action; and they undertook to do certain things which they had not done.

Mr. Hughes remarked that they had done everything they undertook to do.

Mr. Cunliffe said he should prove that they had failed to carry out many things.

His Lordship asked what was the nature of the defence?

Mr. Hughes replied that it was that there was absolutely no damage whatever worth speaking about; that there was no nuisance; and that there was the gravest doubt whether a single tree had been affected. At the present time, the works were in an admirable condition.

Mr. Cunliffe said the plaintiff had offered to find £1000 towards the cost of making certain alterations which had been suggested.

Mr. Hughes said this sum would go but a very short way in effecting the desired object.

Mr. Cunliffe admitted that the defendants had made some trifling alterations; but he denied that the principal things agreed to be done had been done. In 1911 the plaintiff found that defendants contemplated increasing the number of retorts, as the strain on the works was such that they were taxed to their utmost capacity. He attended an inquiry held in 1912 by the Local Government Board, and objected to any extensions on the present site; but the Inspector ruled that he had no *locus standi*. It appeared that the number of retorts was increased from 24 to 40; and the nuisance having become worse, the present action was instituted. It appeared that the make of gas had gone up from 2½ million cubic feet in 1880 to more than 31 millions; and the

nuisance was such that it prevented the development of valuable land on the margin of plaintiff's estate.

His LORDSHIP asked whether defendants had a right to discharge noxious vapours over a person's land.

Mr. CUNLIFFE said he thought not. The law was clear that a person was entitled to pure air, and that the defendants had no right to pollute it. They did not claim as a right that they were entitled to commit a nuisance; all they said was that there was no nuisance. He should prove by witnesses that there was a very serious nuisance.

EVIDENCE FOR THE PLAINTIFF.

Mr. *T. B. Farrington*, Assoc.M.Inst.C.E, gas engineer, of Llandudno and Manchester, said that from 1870 to 1899 he was Borough Surveyor of Conway, and had charge of the gas-works. He had had 35 years' experience of gas-works. He had prepared a plan showing the works as they existed. There were 24 retorts in four settings of six, and also two settings of eight. The retort house chimney was 38 feet high. A second plan had been prepared showing the changes which had been made at different times. In 1880 there was a small retort-house with five retorts, a coal-store, purifier-house, station meter, lime-store, a cottage, and two small gasholders. In 1887 the retort-house had been slightly enlarged; the number of retorts being increased to eight. In 1899 a new gasholder was erected. In 1912 there was built on the easterly side of the works a new retort-house containing 16 retorts. The purifying-house, meter-house, and meter had also been erected on that side, and the cottage was removed to make more room. A new scrubber-house and a governor-house were put up, and a new gasholder erected. In 1913 the number of retorts was increased to 40. The area of the land upon which the works stood was 2 roods 28 perches; being the same now as it was in 1880. Under the agreement for the settlement of the previous action, the defendants had to construct certain ventilating shafts; but, speaking as a practical engineer, he did not consider that the four shafts which had been erected at all answered the purpose. The defendants also agreed to close the circular openings in the wall of the retort-house on the side nearest the plaintiff's land; and this had been done with some old purifier grids covered over with corrugated iron. The effect, however, was not to make them solid, with the result that fumes escaped through the openings. He had visited the works about eight times; and on each occasion he found the openings covered up. When the retorts were charged, smoke and vapour were given off in large quantities; the latter being very disagreeable. In 1881 the make of gas was 2,500,000 cubic feet, the amount of coal carbonized being 300 tons; in 1886 the make had increased to 4,169,060 cubic feet, and the coal carbonized was 447 tons; in 1911 the make had gone up to 31,444,000 cubic feet, and the coal carbonized was 2461 tons. When the 40 retorts were worked to their full capacity, there would be 160 charges drawn each day. On the 5th of November last, he visited the works with Professor Thompson, and found dense volumes of smoke coming from the retorts towards the plaintiff's land. The smoke was perceptible both to taste and smell. On the 19th, in company with Mr. Woodall, he again visited the place, and found pretty much the same condition of affairs; and it was to be found on other occasions. The smell was a very unpleasant one, and had a bitter taste. The height of the gas-works chimney was sufficient for the work of the retorts; but if carried to a greater height it would be much better for the plaintiff's property. His land had a value for building purposes; but defendants' works had rendered it absolutely valueless.

Cross-examined: He was in charge of the gas-works up till 1899. After the report made by Mr. Newbigging, the works were improved; and for small gas-works he should say their condition was extremely good. They were fairly well conducted—in fact, as well as they could be. When the retort-lids were closed, there was no escape of fumes. Each retort was drawn about every six hours. The system of charging had recently been much improved, and the operation was performed more quickly. The nuisance was caused by the drawing and charging of the retorts and the slaking of the coke, which was partially cooled in the retort-house. There would be very little smoke from the coke until water was put on it; and the men could not withdraw it until this was done. When he gave evidence at the Local Government inquiry last year, he did not say anything about there being a nuisance, though at the time Mr. Wood was objecting to the proposed extension, as it would have the effect of bringing the building up to the wall of the main road. Counsel put it to the witness that there is never at any time, outside the walls of a gas-works, anything that can be, to any reasonable person, a nuisance. Witness said he did not agree with him. He was not aware that there were close to the gas-works market gardens belonging to Mr. Wood which were let at a very good rent. The field on the east of the works, which also belonged to Mr. Wood, was let for pasture. Assuming there was a nuisance from the gas-works, the value of the land would not be improved for building purposes.

Re-examined: The prevailing winds at Conway were westerly, and the market gardens were not in this direction. If they had more space, the works could be conducted under better conditions. In his opinion, the site was not large enough for works of this description.

Mr. *E. H. Stevenson*, M.Inst.C.E., said he had visited defendants' works, and thought the site was very small. He did not consider that what had been done to the premises was a compliance with the conditions of the settlement of the previous action. The operations of charging and discharging the retorts were carried on during the whole of the day, with certain intervals of rest. The coke was to some extent quenched in the retort-house; and the fumes given off were extremely disagreeable. The smell from the gas-works interfered with the comfort of most people, though he believed some could get used to it. He had never been able to do so himself; and he had only heard of one man who said he had, and that was the late Sir George Livesey, who, however, took great care to live many miles from a gas-works. He noticed that parts of the trees had died; but, not being an expert in trees, he could not say that this was caused by the gas fumes. There was a very disagreeable taste and smell of the products of combustion noticeable in the spinney close to the plaintiff's house. There ought not to be any smoke from the retort-house chimney. Gas-works could not be carried on with horizontal retorts without steam and smoke being given off during discharging.

Wednesday, Oct. 15.

Mr. *Stevenson*, cross-examined by Mr. Hughes, said that when the coke was put near the wall adjoining the plaintiff's premises it was nearly cold; but still there was some steam, and a sulphurous smell came from it. He was not prepared to say how far from the gas-works the smell could be detected; but he should say smoke would carry farther than steam. Steam would not carry more than about 100 yards. Carbonic acid was given off from the furnaces, and this went up the chimney. The whole of the 40 retorts were not used at once; the maximum number would be 24.

His LORDSHIP: Supposing the 40 retorts were in use, the drawing would take longer?

Witness: Certainly; but the usual way is to draw two retorts, charge them, and then go on to the next lot.

Cross-examination continued: Assuming the coal to have been fully carbonized in the retort, there would not be any smoke from it. He had not made observations on the plaintiff's land with a view to detecting the fumes. If the retort-house was from 100 to 200 yards from the plaintiffs' house, there would be no smell. He distinctly felt the hot air from the chimney near plaintiff's premises on the occasion of his visit in March in company with Mr. Farrington. The combustion fumes would be distributed in the atmosphere if the chimney were made higher.

Re-examined: The site was very inadequate, and the works were cramped. The hot air was perceptible to taste as well as to smell.

His LORDSHIP: Does this go on all night as well as all day?

Witness: Certainly.

David Jones, a milkman residing in a cottage about 50 yards from the gas-works, spoke to having detected on many occasions a very strong and unpleasant smell such as would be caused by throwing water on to a fire. This smell was only perceptible when the wind was blowing from the gas-works. He had also noticed smoke when the retorts were being charged.

In cross-examination, witness said the smell was more noticeable when the purifiers were being cleared out.

Mr. *Henry Woodall*, M.Inst.C.E., said that his firm (Messrs. Corbet Woodall and Son) were engineering advisers to a number of gas companies both in this country and abroad. On the 19th of November last he went to Conway, but was not allowed to inspect the gas-works. After spending about an hour examining the outskirts, he met the Manager of the works, who said he had received instructions not to allow anyone to go inside. Consequently witness had to inspect the works from the top of a ladder; and he came to the conclusion that the site was considerably too small for the work to be done properly. The wind at the time was blowing from the works towards plaintiff's house. There was a good deal of steam and smoke when the retorts were charged and drawn. The chimney which carried off the fumes from the coke fire beneath the retorts was high enough to do the work for which it was put there; but if it were made higher, the fumes would be better distributed. Both steam and smoke were issuing from the louvres of the retort-house. The smoke and steam given off when the retorts were charged were distinctly unpleasant. He could not say how far they travelled over plaintiff's land, as it was a very wet day when he was there; nor could he say what would be the chemical effect upon vegetation. Steam and smoke would interfere with the ordinary comfort of life.

His LORDSHIP: What harm would it do?

Witness: It is unpleasant to be surrounded by smoke, especially in a neighbourhood like this, where one does not expect to have such a thing. It might be expected in a smoky town.

His LORDSHIP: How high up in the air is it?

Witness: It starts about 35 feet in the air, and then comes down.

Examination continued: It would be impossible for anyone to walk across the fields without perceiving the smoke. He observed fumes coming from the chimney. There was not sufficient room at the works for the storage of coke or coal. When the purifiers were re-charged there would be a slight smell which was not unpleasant; but this would only occur once in three months. In his opinion, there was a nuisance of which the plaintiff, as a reasonable man, had a right to complain.

Cross-examined: The smoke would cease immediately the lid was replaced on the retort. By increasing the height of the chimney, the fumes would be distributed more widely.

Mr. *William Thompson*, F.R.S.E., said he had had considerable experience as a consulting analytical chemist. He had visited the *locus in quo* on two occasions. The chief damage was due to sulphur dioxide, which was produced by the burning of the sulphur contained in the coal, and also from the charging of the retorts when the coke was drawn out. Sulphur dioxide was injurious to vegetation, and very offensive to taste and smell. Other compounds of sulphur, carbon, and hydrogen were given off, which were really more objectionable to smell than sulphur dioxide; and these arose from the slaking of the coke as well as from other operations. Sulphuretted hydrogen was also liberated from gas-works. Having examined the condition of the grass in the field adjoining the works, he found there was more sulphur in that nearest the works than in that 200 yards away. He took samples of the grass, and, after drying, tested them for sulphur. The sample nearest to the works contained a greater quantity of sulphur than that farther off. The conclusion at which he arrived was that the source of the damage was sulphur dioxide. He also took samples of the air about 3 or 4 feet from the ground, and found it contained 0·00486 gramme of ammonia per 1000 litres of air, and in a sample taken in the other direction 0·00305 gramme; the difference between the two being 0·00181 gramme. He also examined the trees on plaintiff's land, and found that nearly all had suffered damage; the tops being absolutely free from foliage, due to the noxious compounds having come in contact with them. The trees were also covered with soot, from which he concluded that they were damaged by the vapours from the works. The result of analysis of the samples indicated the presence in the air of a substantial quantity of ammonia compounds or sulphur, which would be injurious. He again visited the place on the 30th of May, and saw that the grass near the works was damaged; and in the plantation an amount of spent oxide had been thrown over the wall, which destroyed a considerable quantity of grass. He made a more detailed examination of the trees, and took samples of the bark of some willow trees and Austrian

pines. He washed it, and found more sulphuric acid on the trees nearer the works than those a quarter-of-a-mile off. Speaking quite generally, as the result of the observations made on these two visits, he concluded that the presence of the gas-works had caused considerable damage to the trees nearest to them; and he had no doubt that in years to come the damage would extend as far as the plaintiff's house. While on plaintiff's land, he could from time to time distinctly smell the fumes from the gas-works, and also see smoke and vapour coming from all parts of them.

Cross-examined: Sulphurous acid was one of the ordinary products of combustion; but sulphuretted hydrogen was not given off by an ordinary fire. It was quite possible that more sulphur might be found on vegetation in Surrey than on plaintiff's land. He did not say that the presence of ammonia would do any harm. The difference between the two samples of air to which he had referred might be due to accidental circumstances. The amount of ammonia compounds and sulphur was not infinitesimal but potential. The risk of error in a small sample was not very great. Spent lime from gas-works was used as a manure when mixed with the soil. He could not admit that all the trees except the willows were perfectly healthy, or that the trees were planted too closely together.

Dr. *E. L. Parry Edwards*, the Chief Medical Officer of Health for the county of Carnarvon, said he had visited defendants' works on several occasions, and had examined the state of the grass close to them. It appeared to be healthy; but several of the trees were bare of leaves at the top, while below there was an abundance of leaves. The bark was of a dark-looking colour, as if discoloured by smoke. This blackness was due to the gases given off by the defendants' works. He noticed the smoke and vapour passing from the works on to the plaintiff's land for a distance of 100 yards; and the fumes had a very unpleasant taste and smell. Speaking as a medical man, he should say the fumes were sufficient to interfere with the comfort of people living in the neighbourhood, and would materially depreciate the value of land for building purposes. He would not live there, even if he had a house given to him. The fumes and vapours given off by the works were such that any reasonably constituted individual might object to.

Cross-examined: The smell from the gas-works made him feel quite ill. He could well believe that his predecessor had not made any complaint, because gas-works were a "trade," and medical officers did not interfere unless complaint was made of the existence of a nuisance. In this case, if complaint had been made, a report, after investigation, would have been sent to the Council.

Re-examined: If Mr. Wood had made any complaint, the matter would have been reported to the District Council, who in this instance would have been the defendants themselves.

Mr. *J. Merry Porter*, a surveyor, valuer, and estate agent, of Colwyn Bay, said he knew the plaintiff's property, the total area of which was some 59 acres. The whole of the land was good building land, and might be developed with advantage, as there was a demand for this land in the neighbourhood. He had no doubt that its value was seriously affected by the proximity of the gas-works. The top of the willow trees was bare for two yards, and some silver beeches had the appearance of being burnt; while some of the grass was dead.

Cross-examined: The value of the land for building purposes would be affected by the gas-works more on the west than on the east side. No one would think of erecting a house worth £100 a year near any gas-works. The land was suitable for cottages, assuming there was no nuisance. Even supposing the works were removed, the land would only be suitable for cottages.

Thursday, Oct. 16.

On the resumption of the hearing,

William Albert Coates, a nurseryman, was the first witness called. He said that in 1902 he was consulted by Mr. Wood as to planting a strip of trees on the easterly side of the gas-works. After going over the ground, and considering the nature of the soil and the wind and fumes, he advised that willows, witch elms, Austrian pines, and silver birches should be planted. In 1905 he noticed that the trees were affected by the fumes; the tops being bare and the leaves scorched. He made a report on the subject. [This was put in and read.] Since then the trees had become more affected; and opposite the retort-house they had not grown as they should have done. The trees chosen were those best adapted to stand fumes. When about 40 yards from the gas-works, he had noticed steam coming from the retort-house and black smoke from the chimney, both being accompanied by a disagreeable smell and taste.

Cross-examined: He was not aware that there were excellent gardens at the Rhyl and Colwyn Bay Gas-Works. There was a good deal of wind and salt air at Conway. Beeches were rather susceptible to fumes. With a north-west wind there would be a strong draught through the plantation, and this would affect any sensitive trees. There were several vegetable gardens near the gas works; but he was not aware that the owners had ever complained of the fumes.

Re-examined: The market gardens were not so near to the gas-works as the plaintiff's plantation.

Joseph Tindall, a market gardener at Conway, said for many years he was head gardener to Mr. Wood. The retort-house formerly stood on the opposite side to that which it now occupied. He generally confirmed the evidence given by the last witness as to the effect the fumes had had upon the trees, and identified several photographs showing smoke passing over plaintiff's land. He also produced the dead tops of trees cut the previous week.

In cross-examination, witness said the trees were planted 37 years ago; but this did not prove that the fumes had not done much harm. Out of 24 willows which he planted, only one had died. When the gas was purified by lime, he frequently detected a bad smell; but this was remedied when the oxide system was adopted.

James England, head gardener to Mr. Wood, corroborated the evidence given by the preceding witness that the proximity of the gas-works made the place dull and unpleasant, particularly when the wind was blowing from the westerly direction. He had kept particular observation on the works, and had noticed smoke and fumes being carried in great volumes over plaintiff's land. In a heavy atmosphere, and with a slight wind, these hung about for some time. He made notes on different occasions, and his note for the 3rd of March, when Mr. Stevenson made his inspection, was "wind N.W. by W.; very rough wind from W.; lot of smoke in the trees, but soon blown away by the high wind." Between the 24th of March and the 27th of June he did not make a note of his observations, as one day was merely a repetition of the former. Since the alteration of the retort-house, the nuisance had greatly increased.

Cross-examined: His chief complaint was about the purifiers. He did not know how often they were changed, but he knew the smell lasted for more than an hour. By direction of Mr. Wood, he had kept a continuous record of his observations from the 5th of October to the 24th of March. The smoke was principally seen when the retorts were being drawn and recharged.

Edward Percival Beare, a gardener, spoke to having been called in during 1911 to cut away the dead wood in the spinney, and said that during the two days he was so employed he noticed smoke and steam coming from the gas-works. The steam soon went away; but the smoke hung about the trees. The branches of these were black and far from being of vigorous growth, being somewhat stunted. There was nothing but the gas works to account for the soot that was found on the trees.

John Roberts, an under-gardener in plaintiff's employ, said he assisted in planting the trees 38 years ago. They were well and truly planted, and were not overcrowded. It was part of his duty to clean the trees; and he noticed that those in the spinney had hardly made any growth during the last ten years. He attributed this to the smoke and steam from the gas-works. He had also felt the hot fumes coming from the chimney which smelt of sulphur. One of the trees planted eleven years ago had died, and the others were in poor condition. After the previous action was settled, the coke was slaked right against Mr. Wood's wall, and complaint was made about it.

Edward George Swetnam, a retired railway cashier, said he knew the district in question very well, and had constantly seen smoke and steam coming from the gas-works and passing over plaintiff's land.

His LORDSHIP: How far do you live from Mr. Wood?

Witness: About a mile.

Examination continued: On the 18th of July he called Mr. Dixon's attention to the smoke and steam issuing from the retort-house. Mr. Dixon was the Gas Manager, and at the time was testing the pressure of gas. On the 26th of February, he was on plaintiff's land for two hours, and all the time he could both taste and smell the smoke. He thought Mr. Wood was justified in complaining.

Tuesday, Oct. 21.

On the hearing being resumed this morning,

Mr. *E. Honoratus Lloyd*, K.C., said he knew the gas-works very well, and on one occasion, when walking across the fields towards the works, he noticed smoke and steam coming from them; but he had no recollection of observing anything coming from the chimney. The steam was caused by a man throwing water on to hot coke. The smoke which came through the louvre openings found its way over the plaintiff's trees and land.

This was the case for the plaintiff.

THE DEFENDANTS' CASE.

Mr. HUGHES, in opening the case on behalf of the defendants, contended that no substantial damage to the plaintiff's vegetation had been proved; and, further, that there was no nuisance caused by noxious fumes and vapours. It was impossible to have a nuisance in the abstract, apart from somebody who was annoyed. He then called the following evidence.

Mr. *William Newbigging*, Assoc.M Inst.C.E., said he inspected the gas-works on the 11th of December last; and, speaking generally, he thought they were entirely satisfactory—in fact, they were a model of their kind. They were not what he should call congested. For instance, the retort-house was a commodious one, with plenty of accommodation for the operations to be carried on in a satisfactory way. It might be as well if they had a little more yard room. The chimney was sufficiently high for the purpose for which it was built; and it would not be any advantage to the plaintiff to have it raised. It would not be possible to feel on the ground at a distance of 20 yards the hot gases coming from the chimney. The system on which the works were conducted was carried out with the view of utilizing as much of the heat as was possible. The retorts were not heated on the direct-fired system, but on the regenerative system; the air supplied to the furnace being heated by the waste gases. The result of adopting this system was that the waste gases, as they left the setting, were cooled down to a very low point. As a matter of fact, their temperature at the base of the chimney was about 700° Fahr. By the time they reached the top of the chimney their temperature was brought down to about 260° Fahr.; at a distance of 3 feet from the top there would be a further drop to about 120°; and at a distance of 10 feet from the chimney there would be a further drop to 84°. It would not pay the Corporation to let any of these waste gases escape from the furnace in a hotter condition than they could possibly help, as they wanted to utilize them. He agreed with the evidence given by Mr. Stevenson and Mr. Woodall that it would take about five minutes to draw and charge a retort. When the retorts were sealed, there would be no smoke coming out of them. During the drawing and charging operations, there was not a serious quantity of smoke. It was less at Conway than in certain gas-works; for the reason that the ascension-pipes which conducted the gases from the retorts were about 5 inches in diameter. These pipes were very liable to become choked with tar; but practically nothing of the kind occurred at the Conway works. From inquiries he had made, he found that they had only six stopped pipes in about nine years; so that that which was a very common cause of complaint in many gas-works was not present here. There was not more than the usual quantity of steam caused in slaking the coke. This steam did not carry very far; it was dissipated at once.

Cross-examined: He would not go so far as to say that no smoke, steam, or fumes came from the gas works on to the plaintiff's land.

There was no smell which might be called unpleasant. No one would deliberately choose to breathe or taste an atmosphere of carbon dioxide and nitrogen. Probably to an ordinary person the smells would be considered unpleasant. He did not dispute that Mr. Stevenson had noticed the smell and fumes from the chimney at some distance on the outside of the spinney; but he thought these might have come from a pocket of air, and were not the fumes from the chimney. He was quite aware that Mr. Thomas Newbigging, his father, condemned the present site of the gas-works in 1900, and recommended their removal to another site. He neither differed from nor agreed with this, as he did not know the conditions in 1900 when the report was made.

Mr. *R. G. Shadbolt* said that, speaking generally, the Conway works were well designed and conducted, and all the operations were carried on there in a very proper manner. On the occasion of his visit, he saw some retorts being drawn and charged. On this occasion the wind was westerly. He at once recognized the proximity of the works from the characteristic odour given off by such works. This would be at a distance of perhaps 50 yards. There was nothing which might be called offensive. He also noticed the trees on the plantiff's land, and, so far as he was able to judge, they were in a fairly healthy state, except that there was at one point between the retort-house and the meter-house a gap where the tops of them were somewhat stripped. He noticed a light blue haze coming from the various openings in the retort-house, followed by a little steam when the retorts were being drawn. His primary object in going to Conway was to inspect the gas-works, and form an opinion as to whether or not they were properly designed. Then he was asked to go round the plaintiff's ground and notice the trees and vegetation generally. He observed nothing that he should consider offensive. He did not feel any heat from the chimney, though he had done so at other gas-works. Speaking as a practical gas engineer, he could not recollect any occasion on which he had experienced heat coming down from any retort-house from either a short or a tall chimney. In his own town (Grantham), there were fruit trees around the gas-works.

Cross-examined: He had practically lived on gas-works all his life, and was more or less inured to their smells. They were not a nuisance to him, though hypersensitive persons might object to them.

Mr. *James Smith*, Engineer and Manager of the Colwyn Bay Gas-Works, said these works were about three times the size of those at Conway. When he visited them in March, he saw the retorts drawn and re-charged. This operation, to the best of his knowledge, occupied five minutes. He could not say that he perceived any smell from them outside the works, though he noticed steam resulting from the quenching of the coke. He did not feel any heat from the chimney, or smell any fumes from it. On the previous Saturday, he again visited the works, and went up the outside of the chimney by a ladder. He then held his hand over the top of the chimney, but did not feel any great heat. He could have held it there for a few minutes without discomfort. He did not take the temperature with a thermometer.

Cross-examined: He was not aware that Mr. Thomas Newbigging condemned the works in 1900, on the ground that the site was too small. This was not his opinion.

Wednesday, Oct. 22.

Mr. *Fraser Story*, Professor of Forestry, said he had been resident in Bangor for 9½ years, and was acquainted with the conditions with respect to forestry in North Wales. He examined the trees in 1909 on behalf of the Corporation, and reported that three Austrian pines had been damaged by fumes from the gas-works, but that all the other trees were of robust growth. Owing to the configuration of the ground, there was a strong draught which did not do certain trees any good; and he suggested that other kinds of trees should be planted. On the 20th of June last he again inspected the trees, and found that the pines had recovered, though the soil and situation were not suitable. The other trees had grown very satisfactorily, considering the condition of the soil and climate. The trees suffered greatly from west and north-westerly winds, which were those prevailing, and from the air being strongly impregnated with salt. He was of opinion that the trees were not affected by anything coming from the gas-works. The dead tops were due to exposure to the wind and salt. Soot on the bark would have no injurious effect. Carbon dioxide would not injure trees, though smoke would. Steam did no harm, as it quickly dispersed.

Cross-examined: A certain amount of injury might have been done by the gas-works; he was not prepared to say that it had not been caused to the vegetation. As the trees had recovered, he must have been wrong when he reported in 1909 that the primary cause of damage was the fumes from the gas-works. He was ready to admit that the practical foresters who had been called on behalf of the plaintiff, and who had had care of the trees for more than thirty years, knew what they were talking about. If the state of things disclosed by the photographs was continuous, it would clearly do injury to the trees.

Mr. *R. J. Gibson*, Professor of Botany, who had examined the trees on the plaintiff's land, said those in the plantation were not in so robust a condition as he should have liked to see them, but they were not suffering from any serious injury. He generally confirmed the evidence of the last witness that the damage was trifling.

In cross-examination, witness said that, assuming the products of combustion came through the trees, and could be smelt and tasted, as described by the witnesses, he should expect the trees to be damaged. He did not notice any heat from the chimney.

His LORDSHIP: There must be heat and sulphurous fumes coming from the chimney.

Mr. HUGHES: No doubt; but on a calm day, such as Saturday, the 18th inst., when witness visited the works, the heat would, of course, go straight up.

Dr. *Harold G. Colman* said he visited the gas-works, accompanied by the Town Clerk and the Borough Engineer, on the 7th of February last, and found that all proper precautions were taken to prevent undue production of smoke and steam. Neither was produced in the actual distillation of coal, but only when the retorts were drawn and charged; and these operations were performed under the best conditions for avoiding smoke and steam. The coke was drawn from the retort, and as it passed the mouthpiece smoke arose. It was put into a barrow, quenched with water, and wheeled into a yard, where more water was put on, so as to quench it completely. The amount of smoke from the retort-house was comparatively small, and would be visible for 40 yards. The openings in the wall opposite plaintiff's property were covered; but those in the new portion were not. Blocking-up these openings was a mistake, as it spoilt ventilation. Increasing the height of the chimney would be an advantage to the spinney, but not to the estate in general. He visited the place again on the 20th of June and saw the retorts drawn and charged, but did not notice any fumes on the plaintiff's property. He made tests for sulphuric acid on the leaves of birch trees after drying, to see if the damage was due to fumes from the gas-works. The tests showed that whereas the leaves from the birch trees on the plantation contained 0·18 per cent. of sulphuric acid in the form of sulphate, the dried leaves from a tree growing in the open country at Oxshott, in Surrey, contained twice this amount. Leaves naturally contained sulphuric acid in the form of sulphate, and the quantity would vary according to the soil in which the tree was growing. So far as he could judge, no substantial injury was being done to the trees by fumes from the gas-works.

Cross-examined: He substantially agreed with the evidence given by Mr. Woodall and Mr. Stevenson as to what happened when retorts were drawn and charged. With vertical retorts, offensive fumes were not given off. On the present site there was no room for gasholder extension.

Mr. *J. Lloyd Edwards*, an Inspector of Factories, said there were 45 gas-works in his district, including those at Conway, which he inspected from time to time and found they were carried on in a satisfactory manner. If they were wrongly conducted, so that the reasonable comfort of the employees was affected, it would be his business to interfere.

Cross-examined: He only spoke of what took place inside the works. The more the noxious fumes escaped from the works, the better he would be pleased.

Mr. *John Richards*, head forester in the employment of Lord Penrhyn, deposed to having visited the plaintiff's estate and finding the trees in splendid condition. All over North Wales the willows were dead at the top. There was nothing to indicate that the trees had been in any way damaged by fumes from the gas-works.

Mr. *Henry Dixon*, the Gas Manager to the defendants, said he was formerly Manager of the Bridlington Gas-Works. The works at Conway had been considerably improved and enlarged since 1899 when he went there. The new retort-house was built in 1901, and in 1904 a new gasholder was put up. The annual make of gas was about 32 million cubic feet. The work was carried on as carefully as it could be, and all the plant was thoroughly satisfactory. There were 40 retorts in all; but never more than 24 were in use at one time. Six retorts were drawn and charged every two hours; the average time occupied being about five minutes. The smoke and steam had to escape from the roof and the openings at the side. The coal, which was obtained from the Wynnstay Colliery, North Wales, was very free from sulphur. After the previous action was compromised, the openings in the wall were closed, and ventilating-shafts put in; and now there was no escape of smoke from the openings. He had not noticed how far the smoke and steam went over plaintiff's land when the wind was in the west; nor had he received any complaints of the existence of a nuisance. Hot coke was never placed against the plaintiff's wall. He had never detected anything but the ordinary smell of gas-works. The purifiers were emptied about every nine months, and there would then be some smell for three days; but it was not injurious.

Cross-examined: He would not go so far as to say that there was no smell from the works. The smoke and steam might be carried for 50 yards over the plaintiff's land. He did not agree with Mr. Newbigging that in 1900 the site was too congested. He believed that Mr. Stott, the Chairman of the Gas Committee, had expressed the opinion that the works were a decided nuisance.

Thursday, Oct. 23.

Mr. *F. A. Delamotte*, Borough Engineer and Surveyor of Conway, having charge of the gas-works, said the population of the Borough was about 5600. Recently they had obtained power to supply outside the original area. After taking expert advice, the works were brought thoroughly up-to-date, and they were now conducted with the greatest care. After the compromise of the action in 1909, no further complaint was received until August, 1912. Mr. Wood made no complaint as to the way in which the openings were closed. Witness had never seen smoke or steam issuing from the openings after they were covered. He had kept careful observation on the gas-works since complaint was made by Mr. Wood in September, 1912. No complaint had been received from the Medical Officer of Health as to any nuisance from the gas-works. In 1912, application was made to the Local Government Board for sanction to borrow for the purpose of altering the retort-house. Witness attended the inquiry and gave evidence. No complaint of any nuisance was then made by Mr. Wood or his Engineer.

His LORDSHIP said he did not think the Inspector would have listened to any such complaint.

Mr. HUGHES said Mr. Wood did object to the works being extended to the road.

Witness said the loan was sanctioned, and £2400 was expended on alterations. He passed the gas-works every day, and was in the works two or three times a week. Small quantities of steam and smoke, with westerly wind, passed over Mr. Wood's land for a short distance; certainly not for 200 yards, as it would gradually rise. In his view, there was nothing that could be regarded as a nuisance.

His LORDSHIP: That is the issue I have to try.

Mr. HUGHES (to witness): Have you ever seen anything which would annoy an ordinary person?

Witness replied that he had not. Of course, there were some fumes from the chimney. The furnace was fed with coke from the retorts by means of an automatic trough. When on the ground, he had never felt the fumes from the chimney. If Mr. Stevenson's view was correct, it must have been an exceptional occasion. Milk would rapidly take

up any bad smell; but he had never received any complaint on this head. The paint on the woodwork had not been affected by the fumes, as special paint was used. The trees were affected by north-west winds from the sea. He could not see any damage to the trees except to those which had dry tops—were "stag headed" he believed was the proper term.

Cross-examined: The carrying-on of the works was in the hands of Mr. Dixon, witness being simply the Engineer. He did not consider the fumes from the retorts unpleasant. The steam from slaking the coke was unobjectionable; but the fumes from the chimney, if breathed, would be objectionable. All three would be harmful to anyone who breathed them. A volume of steam, smoke, and fumes, but not a considerable volume, was given off when the retorts were drawn and recharged. It was necessary for the health of the men working in the retort-house that there should be ventilation, so that the fumes might get away. The closing of the openings had made no difference in the quantity of smoke and steam that went over Mr. Wood's land. If the object had been to prevent the smoke from passing out, it would have been better to use sheet iron than corrugated iron. The covers were certainly not air-tight. The retort-house would not have been built right up to the road had they not been short of space. Except so far as a nuisance caused injury to public health, it was no part of the duty of the Medical Officer of Health to interfere. If a prosecution were instituted in respect of a nuisance from the gas-works, the proceedings would be against the Corporation, his employers.

George Lewis Jones, a market gardener and florist in Conway, said his land was about 200 feet from the gas-works. He had never experienced any annoyance from the proximity of the works, and the fruit and vegetables had not suffered damage.

His LORDSHIP pointed out that the only question was whether there was a nuisance to Mr. Wood, not to other people.

Mr. HUGHES said he had several other witnesses of the same class.

His LORDSHIP: You may take it that there is no nuisance caused to other people.

Mr. HUGHES called several persons who resided close to the works, who all stated that they had not suffered any inconvenience from smoke or fumes.

SPEECH FOR THE DEFENDANTS.

Mr. HUGHES, in summing up the case, said it was one of great importance to the defendants. The gas-works were erected in 1860, and the plaintiff purchased his estate in 1875. In 1880, when the Corporation took over the works, Mr. Wood was the most influential member of the Corporation. In the natural course of things, the consumption of gas increased, and it became necessary to increase the capacity of the works. This was done in 1902, when again Mr. Wood was the most influential member of the Corporation. He could not very well complain of the gas-works, as he bought his property knowing they were in close proximity to it. No complaint was made till 1909, when Mr. Wood asked for certain things to be done which, according to Mr. Delamotte, would be of no material advantage, as the best course was to dilute the smoke and steam as rapidly as possible. However, in order to satisfy Mr. Wood, certain things were done without prejudice to the question of whether or not there was a nuisance. Looking at what transpired at the Local Government Board inquiry, it was impossible to suggest that there was then any substantial nuisance; the only objection raised by Mr. Wood being to the retort-house being built up to the main road. Having failed in his opposition, Mr. Wood took up the attitude that the proposed extension would cause a serious nuisance. The inference to be drawn from what took place in 1912 was very strong indeed that there was no nuisance worth speaking about. The evidence given during the trial utterly failed to show injury to vegetation, or, if there was any, it was so trivial that it was not worthy of consideration. It could not be said that carbon dioxide, steam, or soot was deleterious to vegetation. The only injurious product of combustion was sulphur; and the evidence of Professor Story and Mr. Gibson proved conclusively that this compound was present only in such minute quantities as to be perfectly harmless. He submitted that, when the Court was dealing with important works, it would not interfere unless substantial damage was proved. Here it would be impossible for plaintiff to satisfy any jury that he had sustained any damage, as there was no evidence to show that a single tree had been killed; and therefore he submitted that the action should be dismissed. If at any subsequent time plaintiff suffered damage, he could go to the County Court and recover compensation. Dealing with the question of alleged nuisance from smoke, &c., he contended that it was impossible for the plaintiff to succeed, as he had not given evidence that either he or any member of the family had suffered any inconvenience. It was clear, from the authorities, that doing a thing was not a nuisance if there was no living being in the neighbourhood to be annoyed by it. The gas-works ought not to be stopped because possibly in the future someone might wish to erect houses in the neighbourhood.

The further hearing of the case was adjourned till Tuesday (to-day).

The Coal-Fire as an Air Polluter.—At the first annual meeting of the Manchester and District Branch of the Smoke Abatement League, which was held in the Town Hall, Manchester, last Wednesday, Professor Lewes delivered a lecture on "The Domestic Grate and Chimney," and explained the part played by the coal-fire in the pollution of the air. He said that in London 75 per cent. of the smoke curse was due to the domestic chimney. Apart from being a smoke producer, the use of coal for house fires was uneconomical, for, by the escape of its principal ingredients, at least 80 per cent. of its heat value was lost. The gas-stove, with the improvements of the last five years, was not only smokeless, but far more efficient, for it yielded as much as 75 per cent. of the heat value of the gas against the 20 per cent. yielded by coal. Already in London the adoption of the gas-stove had reduced the coal consumption by one-sixth, and the result was that London now enjoyed in a year from 84 to 100 hours of sunshine more than was the case a few years ago. Why should not the gas-fire be adopted universally?

MISCELLANEOUS NEWS.

FUEL, LIGHT, AND POWER EXHIBITION AT SHEFFIELD.

An exhibition designed to promote the fuller utilization of gas and electricity for the production of light, heat, and power, with the special object of assisting to bring about a diminution of the smoky atmosphere which is so characteristic of Sheffield, was opened in that city last Friday.

At the opening ceremony, which was performed by the Lord Mayor (Alderman S. Osborn, J.P.), speeches were made in which it was pointed out that atmospheric pollution was caused not solely by the smoke-stacks of the factories, chief offenders though these may be. Ordinary house fires contributed largely thereto, and it was therefore the duty of householders and manufacturers alike to avail themselves of the means now to be had whereby the smokeless combustion of fuel could be assured. It was the object of the exhibition to show that this desirable end could in many cases be attained with the additional advantage of securing considerable economy. A very telling object-lesson bearing on this latter point was given to the meeting in the speech of Mr. C. D. Leng, of the "Sheffield Telegraph," who was in the chair. He stated that, in order to do away with the emission of smoke from the chimneys of their printing works, his firm put down, in 1900, an installation of Meldrum's boiler furnaces, which consume comparatively worthless coke breeze under forced draught; and the result had been that not only was the desired effect obtained in a smokeless chimney, but, in addition, there was the substantial saving of £18 a week in the cost of boiler fuel.

It was freely acknowledged by several speakers that Sheffield is exceedingly well served in the matter of its gas and electricity supplies; thus favouring the endeavours of those who desire to bring about a purer atmosphere. The Gas Company, however, were criticized for charging a specially low rate for gas supplied to engines, without recognizing the claims of gas cooking and heating to similar treatment. The Electricity Committee were likewise taken to task for supplying motors with current at a very low price, while refusing to make any abatement to all consumers who utilize a large quantity of current for lighting.

The exhibition comprises a varied assortment of the newest forms of gas and electrical appliances for domestic use, as well as of apparatus for the production of power and the application of heat to industrial purposes which appeal more particularly to the manufacturer. The prior claims of the National Gas Exhibition at Shepherd's Bush upon the attention of manufacturers of gas appliances unfortunately prevented the getting together of as representative a collection of gas exhibits as was desirable; and this is given as the reason why the Sheffield Gas Company have not co-operated officially in the promotion of the exhibition. But if the gas exhibits are not so extensive as could be wished, they are fairly representative. For example, Main's gas fires and cookers, Maughan's geysers, the Holborn circulator, and other forms of gas water-heaters, are shown by Mr. L. W. Wilson, of Sheffield. Messrs. John Walsh, Limited, and Messrs. T. B. & W. Cockayne, Limited, exhibit gas fires, cookers, and other domestic appliances by different makers, pneumatic switch lighters, and a varied and well-chosen collection of elegant and artistic gas fittings. An interesting exhibit of Messrs. Fletcher, Russell, and Co.'s gas-heated furnaces for annealing steel, case-hardening, &c., specially adapted for the Sheffield trades, is shown in operation by Messrs. T. A. Ashton, Limited, and the Hornsby-Stockport gas-engine (also at work) by Messrs. Roper and Wreaks, of Sheffield. The Stimex Gas-Stove Company, of London, have a stand for the exhibition of their patent hygienic ranges, hot-water circulators, and gas-fires; but at the time of our representative's inspection it was not wholly equipped, owing, it was stated, to defective transport facilities.

The City Electric Supply Department make, as was to be expected, a brave show of electric radiators and other heating and cooking apparatus, as well as of lighting appliances; and cookery demonstrations by the aid of electricity as well as of gas are to be given during the continuance of the exhibition. Consumers who might be disposed to depend altogether upon electricity for the domestic services had an unpleasant reminder, on Saturday evening, of the fact that reliability is not yet an unfailing attribute of electricity supply. For a few minutes, the exhibition building was, through the failure of the current, plunged in darkness, except for such gas-lights as were in operation.

BRITISH COALITE REORGANIZATION.

An Extraordinary General Meeting of the British Coalite Company, Limited, was held at Salisbury House, E.C., last Wednesday, for the purpose of considering various resolutions to carry into effect a scheme for reorganizing the capital. The resolutions submitted (which were very lengthy) were agreed to, except one referring to the Directors' fees. An amendment to this was carried, cutting down the proposed remuneration by one-half. The main features of the scheme are that, with the exception of 155,784 shares, the unissued shares are cancelled, and the whole of the issued ordinary and deferred shares are reduced to one-fifth of their present nominal value; while the controlling power hitherto vested in the deferred shares ceases. Of the 155,784 shares mentioned, 42,750 are to be allotted as bonus for second debenture subscriptions and other considerations; while 113,034 remain unissued —96,142 ordinary and 16,892 deferred. The capital of the Company will be reduced from £2,000,000 to £400,000. Second mortgage debentures to bring in a net amount of £67,500, and receiving 6 per cent. interest, are to be issued; each subscriber being paid a commission in shares.

The scheme was explained by Mr. James Todd, who presided, and recalled the fact that when presiding at the adjourned annual meeting

last year he referred in strong terms to the wasteful expenditure incurred prior to the middle of 1910 by those who were supposed to be taking care of the shareholders' interests. He had said then that there would have to be a drastic writing-down of capital lost, so as to harmonize figures with facts. It was hoped when in February last year certain agreements were entered into and options given to the Eticoal Syndicate, that the working would be developed at Barking. Unfortunately, during the coal strike, the price of small coal was such as to render it impossible to profitably produce coalite at Barking. In the meantime, the Syndicate had expended a considerable amount of money on improvements in the process which, in the event of the options not being exercised, the Company were under agreement to refund, with interest at 6 per cent. per annum. The idea of these improvements emanated from Mr. Herman Clarke, who was the Company's Managing-Director, and two of his colleagues, who had agreed to give the Coalite Company the benefit of the improvements, without fee or reward. The improvements were protected, and greatly enhanced the value of the coalite patents, from which their Company would, of course, benefit. For some time past, negotiations had been proceeding with the Eticoal Syndicate, Coalite, and the Annote Syndicate, with a view to arriving at a settlement which would be equitable to all parties; and the scheme which the Directors now recommended for the acceptance of the shareholders was the result. The Board were in negotiation with prominent interests in London for the sale of the Barking land at a price which would not only pay off the first debentures, but leave a considerable cash balance in the hands of the Company.

THE PAST AND THE FUTURE.

The resolutions were seconded by Mr. Herman Clarke, who made a long statement on the position, and elucidated various points. He remarked that the position of the Company during the last three years had been one of great financial success. When he was appointed Managing-Director, the entire assets of the Company had been pledged, and there was practically no cash with which to carry on the organization. Arrangements had, of course, to be made to meet the debenture interest and certain expenditure which had to be incurred to carry on the business; and it was extremely difficult to get anyone to put up money. This was done through the efforts of the Syndicates. The Company came out with a very glaring prospectus as to profits, and after three years found themselves in the position that there were no profits and no assets. Consequently, when money was found it was on the understanding that when the Company was financially rehabilitated the people who provided it should be given a fair return for the risk they took. The results at Barking had been so satisfactory that arrangements had been made with one of the most prominent Yorkshire collieries for the erection of a smokeless fuel (coalite) plant on the basis of 200 tons a day. The money for the new plant would have to be found by a subsidiary. Answering a question, Mr. Clarke said he believed the Company's patents were of some value. Coalite, Limited, entered an objection to the filing of a patent in Germany by one of the new processes about which the shareholders had probably read in the papers. The German Patent Office cited the Company's patents against them, and refused them. If the Company protected this position here, they would obtain the basic principle for the production of low-temperature fuel; and if they did this, the patents would be of great value. It had to be fought out. The Company were putting advertisements in prominent trade journals and the general newspaper press warning all purchasers of low-temperature fuel plants that they were buying at the risk of suits for damages by the Company. He thought the value of the patents had been materially improved, not through any efforts of the Company, but from what their competitors had done. The assets now would pay the debts and leave some money in hand, whereas a year ago it was a toss-up whether there would be a foreclosure; so that there had been a decided improvement in the whole position. Further questioned, he declared that the whole of the process was wrong, from start to finish; and it had all had to be changed. Now they were putting down the first commercial plant ever erected by the Company. He had no doubt that, following the erection of this plant, within the next three or four years they would have a great many plants scattered over the country. They were not putting them in any town, but at the pit's mouth. The price of the coal was absolutely fixed during the life of the plant, subject to labour conditions. They would not get any coalite in London for the next year.

The series of resolutions having been put together and passed, meetings of the ordinary and deferred shareholders followed, when the scheme submitted was agreed to. The proceedings throughout were quiet—a fact which is perhaps worthy of remark, considering the large amount of money that has been lost by shareholders. Possibly it is to be accounted for by the fact that they had long since been disillusioned, and forced to recognize the truth of the position.

BIRMINGHAM GAS-METER CONTRACTS.

The Gas Committee Challenged.

At the Meeting of the Birmingham City Council last Tuesday, there was a heated debate with reference to the gas-meter contracts of the Gas Committee—a subject which had been before the Council on a previous occasion. [See "JOURNAL" for Aug. 5, p. 390.]

Mr. STEVENS moved a resolution in favour of the appointment of a Committee of seven members, independent of the Gas Committee, to inquire into the whole business of meter contracts during the year. [The principal points of the inquiry, with a summary of Mr. Stevens's previous remarks and some additional particulars, were given in the "JOURNAL" for the 30th ult., p. 946.] In the course of his speech, he contended that the Gas Committee and their officials, in placing a meter contract for £36,000 without seeing the drawings and specifications of the French patent, showed gross carelessness. They ought, he said, to have satisfied themselves that the patent was valid. Paying a royalty of 1s. 6d. per meter, there was a loss of £7 10s. per week, as it was proposed to make 100 meters weekly. As the contract was for five years, a loss of £1950 was threatened; and this loss would have occurred but for his intervention. Further, he alleged that there had been preferential treatment between the firms tendering; the French concern being given an opportunity to contract for 20,000 meters, while in the case of the other firms the tender was for 12,000. An instruction given to the Secretary to see if the patent was valid was totally disregarded. He argued that, as a result of the methods adopted by the Gas Committee, the total loss to the ratepayers was £7200.

Mr. GREGORY seconded the motion.

Sir HALLEWELL ROGERS, Chairman of the Gas Committee, in replying, pointed out that it was generally recognized that there was a "ring" in the meter trade; and, in the opinion of the Gas Committee, the Birmingham ratepayers had been suffering from the absence of active competition. The prices quoted by the "ring" were for their old type of meter at 40s 6d. each for 4000 on a one-year's contract, and 38s. 6d. for 12,000 on a three-years' contract. Messrs. Thorp and Co. quoted 37s. per meter for one year, and 36s. per meter for three years; and this was for a new type of meter of larger capacity. They were not a French firm but a Manchester firm, and they agreed, if the contract were placed with them, to manufacture the meters in Birmingham. Their meter, in the opinion of the expert officials of the department, was the best offered. As a matter of fact, it was practically equal to a ten-light meter at a lower price than the "ring" price for a five-light, which was a great advantage to the ratepayers and consumers. The immediate saving to the ratepayers amounted to £6500, instead of Mr. Stevens' assumption that it would be a loss of £7200. He denied that any favouritism had been shown to any contractor.

After further discussion, the resolution was put to the vote, and defeated by a large majority—viz., 21 for and 75 against, and 14 not voting.

DANISH GAS COMPANY.

An Increased Dividend—The Late Mr. Cridland.

The Annual General Meeting of the Company was held last Tuesday, at Millbank House, Westminster, S.W.—Sir CORBET WOODALL, D.Sc., M.Inst.C.E., in the chair.

The LONDON AGENT (Mr. H. G. Warren) read the notice convening the meeting, and the minutes of the last meeting; and the Directors' report [*ante*, p. 240] and statement of accounts were taken as read.

The CHAIRMAN remarked that the report, which was in the hands of the shareholders, told the story of the Company for the past year pretty fully; but there were a few circumstances which admitted of, and perhaps demanded, further comment and explanation from the Directors. First in importance, the Board were able to report that one of the concessions—that from the considerable town of Odense—had been renewed until the year 1954, on terms mutually satisfactory. The Commune of Odense had the right to take over in 1915 the Company's undertaking in their town, paying for it the structural value on the basis of arbitration. The Board had now agreed to make, out of the price received for gas, a contribution to the funds of the town, and, further, to hand over the works and plant at the end of the period free of charge to the Commune. If the Commune so wished, they might give notice in 1935 to take the transfer in 1945 or 1950, in which case the Company's contribution out of the price of gas would be reduced, and back payments in excess of the revised rates would be repaid, with 4 per cent. interest. The free transfer at the end of the extended period would, naturally, involve the rearrangement of the sinking fund, or amortization fund, so far as Odense was concerned. One incidental, but considerable, advantage of this new arrangement was that it removed some difficulties which threatened the carrying out of the Company's contract with the adjoining Communal district of St. Hans. This area was now taking a considerable quantity of gas from the Company, which was manufactured on the works at Odense. The Commune of Gjentofte (Strandvei) had had the right to assume the gas supply of the very large area under their control, taking over the Company's works and mains for the purpose in 1918. An agreement had been made whereby this right was deferred until 1923. In Gjentofte, the terms of a transfer, if made, would be on a valuation of the undertaking as a going concern—that was, on the basis of profits, and not mere structural value (a very different matter). The arrangement with Gjentofte provided that at every five-year period after 1918 they should have the right to take possession; but it had been seen how extremely inconvenient this was to the Company in considering what arrangements they should make for future alterations and extensions of the works. This agreement had at any rate lengthened the period by some years. Judged by the profit and loss account, the year had been a successful one. Coal cost more than in the previous year by £16,377; but against this the revenue from gas increased by £19,879, and there was an improvement in receipts for residuals. As the shareholders were aware, the price of gas in Denmark fluctuated with the cost of coal. Of the additional gas revenue reported, £15,031 was due to this arrangement; the balance of £4848 representing increased business. He thought this was clear. The Company were entitled, when the price of coal went up above a certain standard, to charge a higher price, according to a sliding-scale. When the price fell again, the price of gas went down. Apart from this main factor, there was nothing special calling for notice in the accounts. There was brought into the profit and loss account £51,313; the balances of profit from the various stations, *plus* interest on deposits, &c., amounting for the year to £83,234—together £134,547. After payment of the interim dividend, together with debenture interest and loss on exchange, and transferring £15,000 to the reserve and redemption fund, there was £90,327 available for final dividend on the preference and ordinary shares. The Directors, after careful consideration of these figures, had come to the conclusion that they could with confidence recommend the shareholders to raise the dividend upon the ordinary shares from 9 per cent., at which it had stood since 1904, to 10 per cent.; and, further, that for this year a bonus of 2 per cent. additional be divided. They wished it to be clearly understood that the bonus was an occasional one only, not a

fixed and regular addition to the amount divided. The dividends declared would be paid free of income-tax. If these proposals were approved, there would be carried forward £58,077, or £6764 more than last year. This, he thought, proved that the action proposed was not rash or imprudent; and a few other figures from the accounts should confirm this view. The reserve and redemption account now stood at £240,188, of which £104,875 was invested in outside securities, excepting for the £12,688 which had been used to purchase the Company's own shares when the price was low. The net amount added to the reserve fund during the year had been £18,732 The balance of profit and loss would, as he had said, be over £58,000, or nearly a full year's dividend and interest, with the bonus added. The liquidation of the Company's undertakings at Randers and Aalborg had clearly shown that the provision for amortization, to which he had referred on previous occasions, was designed on eminently liberal lines. The capital account had been swollen by £58,000, which was much more than the increase of the Company's business for the year would justify. The Board were, however, making provision for some years ahead; and he did not doubt that they would shortly again reduce the proportion of capital to gas sold. Of the £58,000 of capital, there had been spent £5700 on land, £41,766 on buildings and plant at their several stations, including gasholders (part paid) at Flensburg and Frederiksberg, and £10,000 on mains and distributing plant generally. The 4 per cent. debenture stock had been reduced altogether by £20,980, of which £5610 was purchased in the year under review. A further amount of £5307 had been invested in the Company's own shares. They now held 557 preference and 623 ordinary shares, the dividends on which amounted to £953 per annum. These were in addition to the 3500 ordinary shares specified in the published capital account. He was glad to report that an agreement had been come to whereby the town authorities of Aalborg took over certain lands called the Tilegarden, which the Company had held for a considerable time, and which brought in little revenue. The Tilegarden was bought by the Company as a possible site for new gas-works; but, after the purchase was made, land was provided by the town, and the Company were left owners of property not needed for their operations. The purchase price was, in the opinion of the Directors, a fair one; but the payment was to be by instalments extending over twenty years—the unpaid balance bearing interest at the rate of 4 per cent. No event in the history of the Company had caused such universal and keen regret as the death of their late Agent and General Manager in Denmark, Mr. Cridland. To his absolute integrity, his charming and sympathetic nature, which enabled their negotiations and occasional differences with local authorities to be always conducted in a friendly spirit, they owed the repute in which the Company stood wherever they had done business. No statement of his on behalf of the Company was, he (the Chairman) believed, ever questioned. To speak with him was to trust him entirely. His funeral evoked a most gratifying demonstration, at which many Danish towns were officially represented. Only a few days after Mr. Cridland's death, his wife followed him. Two of his sons were now in the service of the Company; and the Directors had made some provision for the future of his unmarried daughter. The vacant office of General Manager had been conferred on Mr. A. W. Edwards, the Company's Chief Engineer, who had had a life-long association with the affairs of the Company. The chief office had been committed to the care of Mr. R. L. Cridland, their late friend's second son. To the regret of all, Mr. Edwin Waterhouse, who had for seventeen years given the Company the benefit of his services as Auditor, had resigned; and it would be for the shareholders to elect another gentleman to fill his place. He had now pleasure in moving that the report and accounts be received and adopted.

Mr. R. S. GARDINER seconded the motion.

Mr. A. BAIRD remarked that for some years it had been his privilege, at the annual meetings, to congratulate the Board of Directors upon the excellent reports and satisfactory balance-sheets which from time to time they had laid before the shareholders; and he was sure that on this occasion the feelings of satisfaction which the shareholders experienced at the result of the year's financial operations were of a specially gratifying nature. There was, however, another incident which had occurred in the history of the Danish Gas Company which he would like in the first instance to allude to, and that was the knighthood which had been conferred by His Majesty on their respected Chairman. [Applause.] There was a well-known passage in "Twelfth Night" which said: "Some are born great, some achieve greatness, and some have greatness thrust upon them." He was sure they were all of opinion that the greatness which their Chairman had achieved had been the result of merit and distinction in that industrial field in which he had made for himself a name as being *facile princeps* the greatest living authority in all that appertained to undertakings like their own. On behalf of all the shareholders of the Company, he begged to offer to Sir Corbet Woodall their very heartiest congratulations, and to express the hope that he might be long spared to enjoy the well-earned honour which had been bestowed upon him. Turning to the accounts, he found himself again in the sphere of congratulation; and he expected the general opinion was that, when the business and profits of the Company were found to be in such a satisfactory condition as to justify an increase of 2 per cent. in the form of distribution to the shareholders, there was not much room for criticism. The interesting and instructive narrative which the Chairman had given them of the position of the Company enabled the shareholders to realize that the undertaking continued to make most satisfactory progress, both as regarded prosperity and profits; and it was gratifying to observe that in Denmark they appeared to be free from any of those labour troubles and disturbances which frequently affected similar undertakings at home. One of the prominent features in the balance-sheet was the large sum of £100,000 which stood at the debit of capital account, and which indicated large outlays during the last two years on land, buildings, &c. He noted that for the present the Chairman did not propose dealing with this. The other matter which he would like to refer to was the holding of the Company's shares in the investment account, which had been increased this year to a larger sum than the year before. He had rather hoped that this item would have disappeared from the investment account altogether. Like all other sound companies who had wisely invested their surplus funds entirely outside the business, the Board had had to write-down values to the current prices. He hoped they had now seen the end of this, and that the policy would be adopted which he had again and again strongly advocated, of yearly adding, as business expanded and liabilities increased, to the investment account in such a form as would make it a liquid asset, and available at any time to meet any contingency that might arise. He was sure this was sound finance; and he ventured again to commend it to the careful consideration of the Board. He had much pleasure in supporting the motion that the report and accounts be adopted.

The CHAIRMAN said he thanked Mr. Baird cordially for his very kind words. With regard to the observations on the accounts, the only question to deal with was that of the investment of their money in their own undertaking, instead of outside it. They had invested, as he had said, £104,000, less £12,000 which was in their own concern. The Board had invested this outside; and when they had paid the next contribution of £2000 to the depreciation of these investments, they would have cost the Company £13,000. If they had wrapped their money up in a napkin and buried it, they would have been better off than they were with the investment of this sum of over £90,000. He quite agreed that this had happened in exceptional circumstances, and that these were exceptional times; and they hoped they would mend some day. But the point he would urge Mr. Baird to re-consider was that which was represented by his observation on the Company's increasing liabilities. It was quite true that they were spending more capital; but it could not be said, he thought, that their financial responsibilities were increasing. Their contracts were terminable within a certain time, each of them; and when the time came that they reached their limit, then, instead of losing money—he meant losing cash—they received in every case large sums of money, which they had to invest; and he maintained, with great respect for Mr. Baird as a financier—and he always spoke with the utmost diffidence when differing from him—that, under the conditions of the Danish Gas Company, it would be extravagant finance to go outside and invest at (say) 3½ per cent., with a possible fall such as he had mentioned in the value, and raise money at a cost of 6 per cent. in order to carry on their work. He was glad to know Mr. Baird felt that the prospects of the undertaking were good. The Board themselves were very well satisfied with the position of the Company.

Lieut.-Col. C. M. DAVIDSON proposed that a final dividend for the year ending June 30, of 2½ per cent. on the preference shares, 6 per cent. on the ordinary shares, and a bonus of 2 per cent. on the ordinary shares, be declared, free of income-tax.

Mr. J. H. BIRCHENOUGH, C.M.G., seconded this.

The CHAIRMAN added that it was the intention of the Board, instead of paying an interim dividend of 4 per cent., in future to make it 5 per cent., so as to equalize the dividend more than had been the case in the past.

The resolution was then carried.

Mr. GARDINER said it was his privilege to move the re-election of Sir Corbet Woodall as a Director of the Company; and it was a very great pleasure to be able to refer to his invaluable services to the undertaking. They were all well acquainted with his eminence as an engineer, and with his great gifts as an administrator; but they might not be as well acquainted with the great personal services which he rendered to their Company. Ever since his election as Chairman, he had visited the stations every year. They were scattered in widely distant parts of Denmark and in Germany; and the physical discomfort and fatigue, and the time that he had appropriated to the Company from his other very important and multifarious claims, entitled him to their very sincere gratitude. The results laid before them that day were certainly mainly due to the very close personal attention which Sir Corbet Woodall gave to every single detail of the Company's business, and to a large extent to the supervision he had given to every single item of outlay at all the works. This naturally represented an amount of time which he sometimes thought they were really hardly entitled to claim from one who had so many other demands upon his time and attention. However, they did receive this invaluable guidance and supervision from Sir Corbet Woodall. His colleagues were deeply sensible of the obligations they were under to him.

Lieut.-Col. DAVIDSON, in seconding, remarked that he could only say he thoroughly endorsed everything the mover had stated.

The resolution was heartily agreed to; and the CHAIRMAN returned thanks: assuring them all that he was very glad to be of what service he could to the Company.

Proposed by Mr. H. G. L. DAVIDSON, and seconded by Mr. F. D. MARSHALL, Major E. A. Critchley and Mr. N. E. Waterhouse, M.A., F.C.A., were elected Auditors of the Company for the ensuing year.

The CHAIRMAN then moved that a resolution be sent to Mr. Edwin Waterhouse expressing their regret at his resignation of the office of Auditor, and also their sense of indebtedness to him for the services he had rendered over a long term of years. They were, he added, particularly fortunate in being able to secure Mr. N. E. Waterhouse as successor to his father, and welcomed him very cordially.

Mr. F. W. CHURCH seconded the resolution, which was unanimously agreed to.

Mr. N. E. WATERHOUSE said he would like to thank them for electing him in place of his father as an Auditor. He had for some years assisted his father in the accounts; and he was glad to think that in future, if he came across any question a little too deep for him, he would still have the benefit of his father's advice. He thanked them for the kind things they had said.

Mr. BAIRD said he thought, before they parted, they should pass a very hearty vote of thanks to Sir Corbet Woodall and his fellow Directors, and also a vote of thanks to the Secretary and the staff in Denmark. It did not require any words of his to commend this resolution to the consideration of the shareholders, because the report and balance-sheet were sufficient justification for the vote.

Mr. COHEN seconded the motion, which was cordially passed.

The CHAIRMAN returned thanks on behalf of himself, his colleagues, and the staff. He remarked that Mr. Baird had anticipated a vote he wanted himself to propose to the Secretary and staff. Whatever was due to the Board, he could say with every sincerity that they were under great obligations to Mr. Warren for the very thorough way in which his work was always done, and also to their staff in Denmark.

THE STOCKPORT GAS STRIKE.

Arising out of the strike at the Stockport Gas-Works, the Independent Labour Party have nominated six candidates at the forthcoming municipal elections, "chiefly to fight the retiring members of the Gas Committee, as a protest against the attitude of the Committee during the recent strike."

At the ordinary monthly meeting of the Council held on Wednesday several references were made to the dispute, and protests were uttered regarding the absence of any record of it from the minutes of the Gas Committee. Mr. Royle said he had looked very carefully through the epitome, but failed to find a single reference to the strike which went on in the town for so long a time. Whoever had had to do with the preparation of the minutes had, he considered, been guilty of a neglect of duty. Many meetings of the Gas Committee were, he pointed out, held previous to the minutes being printed. He, therefore, desired to enter his strong protest against such procedure. Alderman Hopkins also spoke in similar strain.

Alderman Fernley (the Chairman of the Gas Committee) said he did not know why the minutes in reference to the strike had not been presented. The only explanation he could give was that everyone had been so fully occupied. The meetings of the Committee had been so extended that it would require a large volume to give the Council any idea of the work that had been done. The Committee, however, had nothing to hide. On the contrary, they courted the fullest possible inquiry all round.

END OF THE NOTTINGHAM STRIKE.

Having involved an indefensible waste of time and money, through purblind methods typical of modern-day trade union propaganda, the strike affecting the former employees at the gas-meter repairing shops of the Nottingham Corporation has at length come to an end. It seems almost ludicrous that, for a period of over 32 weeks, an essential department of the local public service should have been partially "held up" at the dictation of the Executive of the National Amalgamation of Sheet Metal Workers, because the Gas Committee would not consent to terms which practically meant that they were to abrogate the right of control in matters vital to departmental authority. It may be recalled by those who have observed the sequence of events that the trouble, following a sort of internecine feud in which the opponents were the responsible foreman and those who should have been amenable to his direction, arose out of the continued employment by the Committee of a man who had been for many years in their service, and about whose capabilities no question had been raised; the "head and front of his offending," according to the trade union dictum, being that he had refused to contribute to the coffers of the organization represented by the National Amalgamation.

Obviously, however, this was not a matter concerning the Gas Committee alone. The principle involved struck at the root of the administrative control of affairs also by other Committees of the Corporation; and from this point of view the Gas Committee, while adequately preserving authority within their own house, have served an eminently useful purpose in demonstrating that other departments of Corporation activity need not be made subservient to trade union domination. Less possibility of real danger upon this score may be said to exist in Nottingham now than at any period of its municipal history, albeit the weapons of organized labour have been significantly in evidence of late, particularly in regard to the larger number of hands employed at the principal carbonizing stations.

The meter repairers, after their fatuous struggle, find that, for all practical purposes, they are little better off than they were at the beginning of their fight. They have agreed to resume work upon terms which were, in the main, open to them at any time during the last seven-and-a half months, in which they have been wasting hours in fruitless picketing of the shops; the period being one also in which there has been an attempt by the National Amalgamation to "boycott" the repairs of all Corporation gas-meters in trade union centres. The impotence of the labour hierarchy in this connection has, however, been exemplified by the circumstance that, despite repeated threatenings, the work of the department has been maintained without any inconvenience to meter users—and this in a district of a wide-spreading character, where requirements upon the score of repairing are necessarily considerable.

The climax to the long-drawn-out dispute was reached on Thursday, when, after a conference between Mr Alderman Albert Bull, the Chairman of the Gas Committee, and representatives of the men, terms were agreed upon which were regarded as mutually satisfactory; the arrangement being for the resumption of work at an early date. It almost goes without saying that no abrogation of principle is entailed in the settlement, so far as the Gas Committee are concerned. From the first the controversy, now happily ended, had been marked by unnecessary acrimony on the part of several of the trade union leaders. Incidentally also the strike—or the "lock-out," as the men have preferred to designate it—has served as a significant object-lesson, showing that, while the boasted solidarity of the labour party is a convenient text for platform harangues, it has little serious meaning, when put to the test in the light of this Nottingham experience. There had been all sorts of dire threatenings of involving other branches of Corporation workmen in a sympathetic strike; but when it came to the pinch, the members of the Sheet Metal Workers' Amalgamation were left entirely to their own resources, as those who knew something of the inner working fully believed would be the case.

The last week's strike pay was distributed to the men on Saturday, when, at an informal meeting, satisfaction was expressed at the terms of settlement arrived at; the tinplate workers recognizing that, though they have not succeeded in securing from the Gas Committee all for which they contended, the agreement entered into places them in a more acceptable position. This has been quite in accord with the fixed policy of the Committee, who from the first manifested willingness to adjust legitimate grievances. The irritation alleged to have been caused by the continuance of non-union labour in the strike will, in the opinion of the men, be now reduced to a minimum. It is expected that work will be resumed some time this week; the whole of the hands who have been on strike being reinstated.

CONDITION OF THE NEWRY GAS UNDERTAKING.

Reports by the Official Auditors, Accountants, and Consulting Engineer.

At the Meeting of the Newry Urban District Council on Monday last week, the reports of the Local Government Board Auditor (Mr. J. A. Reddy), the Accountants (Messrs. G. Pickering and Co., of Belfast), and the Consulting Engineer (Mr. Isaac Carr, M.Inst.C.E.) on the working of the gas undertaking in the year ended the 31st of March last, came up for consideration.

The Auditor stated that the total payments made in the year 1912-13 were £187 less than in the previous year; but though the outlay for coal was about £500 less, the amount due for coal received but not paid for was almost £1000 more; so that the actual expenditure increased very considerably, chiefly under the head of wages, repairs, maintenance, and new meters. The total receipts showed a decrease of £194—the sales of residual products, notably coke, having fallen off very much; so that, taken all round, the result of the year's working was very unsatisfactory. However, there had been another Manager appointed recently, and he understood that steps were now being taken to overhaul the works and check leakage, which was found to exist on a large scale. The Committee had a dispute with their contractor as to the supply of coal before and during the last strike. The way in which this matter was handled by them left a good deal to be desired, and resulted in costs being incurred. In the event of disputes of this kind, the Committee would be in a much better position if they decided to have in every case a properly drafted form of agreement executed which would clearly set out the terms of the contract.

Messrs. Pickering reported that the manufacture and sale of gas account showed a profit of £911, against £1586 in 1911-12. The receipts showed a reduction in output of £689, and the expenditure an increase of £409. An analysis of the revenue account brought out a deficiency of 19,924,200 cubic feet of gas, equivalent, at 3s. 9d. per 1000 cubic feet, in value to £3735 15s. 9d., which pointed to serious leakage.

The report of the Consulting Engineer gave details regarding the state of the works, pointing out defects he had noticed in the operation of the machinery. The statement of accounts, which showed a debit balance of £775 compared with a credit balance of £299 before, was, he said, extremely unsatisfactory. He appended his analysis of the accounts over a period of seven years, worked out at per 1000 cubic feet of gas sold, and found that the cost of manufacture and distribution had increased from 22d. to 27·63d. This was, in a measure, due to the rise in the price of coal, but more so to the increase in the wages paid and the cost of maintenance; also to the falling-off in the returns from residuals, which, having regard to the price of coal, ought to have shown an increase rather than a decrease as compared with the previous year. The quantity of gas made was returned as 10,373 cubic feet per ton of coal carbonized, while that of gas sold was 6516 cubic feet—the lowest on record; thus bringing up the leakage to the abnormal figure of 36·2 per cent. Mr. Carr was, however, satisfied that the quantity of gas returned as being made was incorrect, being overstated, on account of the high temperatures at which at times it had passed though the station meter. Nothing had been done in the way of developing new business, for which there was great scope in Newry. A comparatively new test meter at the works had scarcely ever been used; and no steps had been taken towards bringing in for testing meters which had been in use for more than thirty years. The Manager, in his experience of him, was anxious and willing to do his best; but, unfortunately, he found, in many respects, that he possessed neither the knowledge nor the experience to enable him to discharge some of the duties of his office with efficiency and economy.

The presentation of the reports gave rise to a long discussion.

Mr. R. KERR referred to Mr. Carr's statement that the late Manager of the Gas-Works (Mr. O'Reilly) was anxious and willing to do his best, but that he lacked knowledge and experience. The accounts disclosed a deplorable state of affairs. They had a falling-off in coke, tar, sulphate, and other things; but what else could they expect in the circumstances? He calculated that the loss was more than £800, against a profit of upwards of £1000 the previous year. The Committee had had to raise the price of gas to cover this deficiency as well as the cost of repairs to the gasholder. However, they were now on the right track, and he hoped the new Manager (Mr. P. B. Ellacott), who was an excellent man, would have every support and encouragement. It appeared to him (Mr. Kerr) that, owing to the improper slaking of lime, and the consequent inadequate purification of the gas, with excessive registration, the monthly returns of gas made were a fraud. In his opinion, the gas-works were a regular gold mine, if only they were properly managed. He saw no reason why the consumers should not have gas at 2s. 6d. or 3s. per 1000 cubic feet. In Coleraine they supplied gas at 2s. 6d.; and surely Newry ought to be able to do the same.

Mr. CARDWELL said the trouble was mostly due to the neglected state of the works when the late Manager was appointed. If they had been in proper order, there would have been a good profit, even under Mr. O'Reilly's management.

The CHAIRMAN (Mr. H. J. M'Corville, J.P.) denied an allegation that there had been "hole-and-corner" work in connection with Mr. Ellacott's appointment, which, he said, was made on the recommendation of the Consulting Engineer.

Mr. R. LONG said the late Manager was more sinned against than sinning. He acted according to his judgment; but, in doing his best, they found that his best was neither sufficient nor efficient.

The reports were adopted.

COLONIAL GAS ASSOCIATION, LIMITED.

Annual Report—Directorate Changes.

In the report to be presented by the Directors of the Colonial Gas Association at the annual general meeting on the 4th prox., they express their pleasure in announcing that the business continues to make satisfactory progress. The total sales of gas in the year ended the 30th of June increased by 28 per cent., which is the highest average rate of increase yet reached. The accounts accompanying the report show that, including the amount brought forward, the balance available for distribution, after deducting debenture interest and the interim dividend of 2 per cent., free of income-tax, paid last April, allowing for depreciation, and adding £400 to the reserve found acconnt, is £5795. Out of this, the Directors recommend payment of a final dividend of 4½ per cent., less income-tax; making 6½ per cent. for the year, and carrying forward £1537. The purchase of the undertaking and assets of the Horsham United Gas Company, Limited, has been completed. The Directors express their sincere regret at announcing the death of their esteemed colleague, Mr. William Coulson Parkinson, who had been a Director since the formation of the Association, and had rendered it valuable service. The Hon. George Swinburne, who had also been connected with the Association since its formation, and was Chairman of the Board in Melbourne, has resigned his seat, consequent upon his appointment by the Federal Government as a member of the Interstate Commission, as already announced in the "JOURNAL." The Directors have placed on record their great regret at his resignation, and their high appreciation of his services to the Association, at the same time congratulating him upon the honour which has been conferred upon him. The Board also record with much regret the resignation, owing to ill-health, of Mr. Henry Andrews, who had been for twenty years a member of the Melbourne Board. To fill the vacancies thus created, Mr. Henry King Hiller, M.Inst.M.E., has been elected as Director in place of the late Mr. W. C. Parkinson, and Mr. Philip Charles Holmes Hunt, M.Inst.C.E., at present Engineer to the Metropolitan Gas Company of Melbourne, in place of Mr. George Swinburne, whom he also succeeds as Chairman of the Melbourne Board. The appointment of a Director in the place of Mr. Andrews is being dealt with. Mr. William Swinburne, who has rendered the Association invaluable services for many years, now acts as Managing-Director in Australia. The Hon. Sir John William Taverner, K.C.M.G., late Agent-General for the State of Victoria, has joined the London Board as an additional Director.

UTILIZATION OF NOTTINGHAM GAS PROFITS.

Such were the financial results attending the Nottingham Corp ration gas undertaking in the last financial year, when a record was established, that to no subject is greater prominence being given during the present period of municipal polemics than to the ratio of allocation of profits and the contingent consideration of relief to the consumers. To remove a good deal of misconception, and to assess at their proper value some crude ideas, the Chairman of the Committee (Alderman Ball) entered the lists last Friday evening, when he emphasized the necessity of a more careful weighing of the issues involved. The fact that the net profit last year amounted to £72,563 was, he pointed out, no warranty for rash experiments, particularly in view of the largely enhanced price of coal and the falling of rates in the residuals market. It would therefore be most unwise at this juncture to contemplate further reductions in the price charged for gas, especially seeing that any lowering of rates must benefit in equal measure consumers resident outside the municipal area, who, while dependent upon Nottingham for their gas supply, were in no way liable for responsibility as to the heavy capital charges involved in the undertaking. There has been a good deal of talk, also, on the part of Nottingham candidates for municipal honours as to the alleged unfair disproportion in the charges made to prepayment meter and ordinary consumers; but in this connection Alderman Ball demonstrated that the alleged grievances were purely mythical—the conditions being absolutely to the advantage of the slot-meter user.

The more important aspect of Alderman Ball's speech, however, related to the determination to keep the Nottingham Gas-Works in the front rank of efficiency by the adoption of the newest processes. Upon the financial score he objected to the policy followed by those previously in the majority on the Gas Committee; pointing out that, when important renewals were carried out some years ago at the Eastcroft works, the greater portion of the money was taken from the reserve fund. This was not, in his view, sound finance; his declaration being that those now associated with him on the Gas Committee had for their object the building-up of a special renewals fund, so that the works might be brought thoroughly up-to-date, and the possibility realized of making gas as cheaply as in any place in the world.

From the point of view of general criticism, it was observed in the course of the meeting that the lighting of some of the most important thoroughfares in the city was of the most inadequate description, and a possible source of serious danger. Some substantial improvements have been effected lately, notably in regard to the adoption of effective lamps of the type manufactured by Messrs. Hutchinson Bros, of Barnsley; but the necessity for an improved illumination of the streets is on all sides being now enforced. It is recognized that the Lighting Committee's operations have for years been absurdly restricted through want of adequate grants, with the result that Nottingham has incurred the criticism of being one of the worst—if not, for its size, actually the worst—lighted town in the Midlands. It has been suggested, therefore, while agreement is manifested in relation to Alderman Ball's objections to unound financial schemes, that something might, with advantage to the city, be spared from the gas profits to supplement the attenuated resources of the Lighting Committee. If this is not done quickly, the small places around Nottingham may in many parts be better lighted than the county town itself.

ELECTRIC LIGHTING IN BATTERSEA.

Gas Workers' Protest against Unfair Municipal Competition.

A suggested scheme by the Battersea Borough Council to light the whole of the streets, where electric mains are laid, by their Electricity Department, which would involve 295 lamps (the charge offered being £2 14s. 6d. per lamp per annum), and a proposal by the Highways Committee to provide at once four electric lamps at a charge of £3 per lamp per annum, to see how the light compared with gas-lamps, brought a protest from the gas-workers of Nine Elms, at last Wednesday's meeting of the Council.

Mr. SULLIVAN, who headed a deputation, said they wished to enter an emphatic protest against the action of the Council in deciding to substitute electric for gas lighting in the Nine Elms district. In their opinion, as practical men, inverted incandescent gas, properly maintained, was by far the most suitable illuminant for streets like those in the district, as well as being much cheaper to instal and maintain. They objected, as ratepayers, to the introducing of electric mains in a district where no demand now existed, or was likely to arise, for the supply of electricity for other purposes. They protested also against the arbitrary and unfair action of the Council in not giving the Gas-light and Coke Company a fair opportunity of showing what could be done to improve the lighting of the streets, seeing that they offered to do it at the trifling cost of £9 10s., as against the Electricity Department's charge of £332 for mains and installations; the comparative charges for maintenance being £2 16s. 1d. for improved gas against £2 17s 6d. for electricity, and £4 against £5 for one larger lamp. He urged that an opportunity should be given the Company of lighting at least one of the streets on the lines of the scheme submitted by them, thus allowing a fair opportunity for the two systems to be judged. Improved lighting in the side streets of the borough was necessary; but the deputation urged the Council to give due consideration to the just claims of the gas industry, and meet their competition fairly and openly. The Gas Company were one of the largest ratepayers, and their hundreds of employees who lived in the borough had for many years contributed in no small degree in assisting the electric light undertaking of the Council. The concern was now on a sound commercial basis; and they considered that the time had arrived when it should be placed on an equal footing with its competitors, and no longer be given the preferential treatment it had so long enjoyed. To thousands of working-class homes in Battersea the Electricity Department meant less than nothing; while cheap, clean, and convenient gas for lighting and cooking was a boon the department could not hope to offer them. If the policy unfortunately adopted by the Council in regard to the Nine Elms district was to continue, it was bound to have the effect of materially reducing the amount of labour required in the manufacture and distribution of gas, while providing no alternative employment. In reply to a question, the speaker added that the meeting was not prompted by the officers of the Gas Company.

The deputation having withrawn,

Mr. RAYNER (Chairman of the Electricity Committee) moved that the matter should be referred back to the Highways Committee, with instructions to proceed with the installation of the 295 lamps.

As, however, no estimate had been presented, the motion was ruled out of order.

Mr. RAYNER went on to say that the electric mains were already in the roads, and were put there years ago with the idea of the Council lighting the public thoroughfares by electricity. The Gas Company had brought their charges down, and had been "touching up" the streets of Battersea simply because of the success of the electricity undertaking. They also found the Company's agents going into the principal roads trying to get the tradesmen to do away with electric light and have high-pressure gas-lamps instead.

Alderman BRIDGE said it was only fair that the Council should apply to the Gas Company for quotations for a light of a similar power to the electric light. Was it fair competition the Council were carrying on against the Company when they were taking their rates in order to set up in business against them?

Mr. SIMMONDS said there were to be seen at the National Gas Exhibition lamps that would far excel any electric lamps the Council now had on the roads. If the Council had not the electricity undertaking, the members would not be discussing the point that evening; but it seemed that they were trying to force their electricity on the residents simply because the undertaking was theirs.

Mr. HAYTHORNTHWAITE said the deputation had presented a clear case. He did not ask for preference to be given to gas; but he thought that to put gas on one side because the Council had an electricity undertaking of their own was grossly unfair. They should compete on fair terms.

The matter was subsequently sent back to the Highways Committee for them to bring up a complete scheme.

Fatal Accident at the Garston Gas-Works.—An alarming accident recently occurred in the yard of the gas works at Garston. A number of men were employed in repairing the mains, and when connecting the pipes, a quantity of gas was ignited and burst into flames. A man named Woods was severely burnt, and had to be taken to the hospital. He has unfortunately succumbed to his injuries. He leaves a widow and several young children.

Finances of the Metropolitan Water Board.—At a meeting of the Metropolitan Water Board on Friday week—the first after the summer recess—the Finance Committee reported that a mortgage loan of £200,000 had been negotiated for a period of two years at 4 per cent.; and the Board decided that it should be treated as a partial exercise of the borrowing power of £1,000,000 conferred by the Board's New Works Act. It was reported by the Appeal and Assessment Committee that the comparison of the recently prepared "standard rental" with the original valuation lists had already resulted in the discovery of rateable values to the extent of £70,000 not in charge.

ELECTRIC LIGHT FAILURES IN LONDON.

For upwards of half-an-hour on Monday night last week, the greater portion of Bayswater and Paddington was plunged in gloom through the failure of the electric light supply. The lights failed at about six o'clock, and there was soon consternation in nearly every big emporium and smaller shop, and candles were produced. In places where gas had been retained, this was requisitioned as quickly as possible. At the Metropolitan Music Hall in Edgware Road, hopes were entertained that the lights would reappear by the time the first performance commenced. Presently they came, but in another minute they again vanished. Just before seven they returned and showed a disposition to stay. The prevailing gloom was equally disconcerting at St. Mary's Hospital, Paddington, where other methods of lighting had to be resorted to. A number of candles were requisitioned, and in some of the departments gas was available. In a letter received from a user of the electric light in the district he states that he was unable to get light for about two hours.

The outlying districts of Hanwell, Brentford, Southall, and Greenford were thrown into partial darkness; and considerable inconvenience was caused to tradesmen. The Grand Picture Theatre at Hanwell closed until eight o'clock, and nearly 600 people had to be turned away. Several public-houses used candles, and oil shops did an extensive trade. The arc lamps on the main road between Ealing and Hanwell were extinguished. The current was restored after two hours. Central London, in the vicinity of Holborn and the Strand, was also slightly affected by the failure, which was caused, it is stated, by a mishap at the principal generating works of the Metropolitan Electric Company at Willesden, by which all the main fuses were destroyed.

THE BAYSWATER SEWER FATALITY.

At the Meeting of the London County Council last Tuesday, the Fire Brigade Committee presented a report dealing with the fatality in a sewer in Pembridge Villas, Bayswater, in March last, an account of which appeared in the "JOURNAL" at the time, and stated that the Royal Humane Society had awarded bronze medals and certificates to the Divisional Officer (North) of the Brigade (Mr. A. R. Dyer), Superintendent J. Pittaway, sub-officers A. G. Peck and A. D. Gordon, and firemen A. E. Barber and W. J. Newberry, in recognition of their services on the occasion. The Society had also forwarded "In Memoriam" testimonials for the nearest relatives of firemen Libby and M'Laren. Arrangements had been made for the medals and the certificates to be presented by the Chairman of the Council, and the "In Memoriam" testimonials would be forwarded to the persons entitled to them. On the subject being reached, the Chairman (Mr. Cyril Cobb, M.V.O.), before handing the medals and certificates to their recipients, said the Council had awarded a silver medal to members of the Fire Brigade for exceptional gallantry at fires, but made no award for gallantry apart from these. When, however, cases came to their notice, they were brought before the Royal Humane Society, in order that that body might consider each case on its merits. In making the presentations, Mr. Cobb not only congratulated the recipients, but also London on possessing such a body of officers and men, ready at a moment's notice to send to any point of danger men capable of upholding the traditions of self-sacrifice and duty. On behalf of the Trustees of the Royal Humane Society, Sir William Bull, M.P., and Mr. Travers Hoare attended the presentation.

The Finance Committee of the Kensington Borough Council have expressed their appreciation of the manner in which the Gaslight and Coke Company have met the Council in regard to compensation in connection with the victims of the catastrophe above referred to—the Company having sent a cheque for £163, being one-half the sum the Council paid to the widow of the sewerman Parry.

OBTAINING ORDERS BY MISLEADING STATEMENTS.

In connection with the letter from Mr. C. B. Tully which appeared in our "Correspondence" columns of the 14th inst., and the report of the case tried at the Market Harborough County Court on the 6th inst. (*ante*, p. 243), it is interestiug to note that, under the heading of "A Deal in Steel: An April Fools' Day Transaction," some particulars were given in the "Ironmonger" last Saturday week in regard to the practices of the plaintiffs in the case referred to, from which it appears that something of the kind has been going on for about ten years, and has been repeatedly exposed by our contemporary. A member of the staff went down to Market Harborough on the present occasion, and made special inquiries, with the result that some light is thrown upon the business methods of the Stellorite Company. The following is the story told by our contemporary.

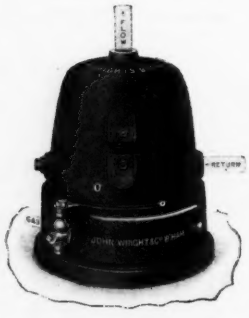
In our issue of Jan. 31, 1903, an editorial note appeared commenting on the dealings of a Liverpool firm with a "very smart Frenchman," from which we now make the following extract:

> So recently as our issue of December 14 we mentioned that certain clever travellers representing French or Alsatian manufacturers of tool steel had succeeded in imposing upon several buyers in Australia and New Zealand by delivering goods of a quality vastly inferior to the samples submitted. The buyers appear to have been told verbally that only a small trial order was desired, and on this understanding they seem to have placed such orders in metric measurements, with which they were unfamiliar, only to find, when the goods arrived, that there was several times more of them than they intended to buy. This rather crude trick was practised upon a number of firms in this country in 1899, and exposed at the time in our columns; but we thought that the field had been worked out here long ago.

This kind of swindle has been repeatedly exposed in the "Ironmonger"

The herald of a great "run" in Gas Boilers.

The "B.T.U." HOT-WATER CIRCULATOR.



As to its efficiency *we* are satisfied; *you* will be when you have tested it.

THE PRICE IS LOW; THE EFFICIENCY IS HIGH.

OUR PRICE IS 50/-

COMPARED WITH AVERAGE PRICE OF OTHER MAKES: £5.

It is this great difference which has already started the "RUN."

Supplies of Special Leaflets for distribution to Consumers will be sent on application.

JOHN WRIGHT & Co., EUREKA and ESSEX WORKS, BIRMINGHAM.

during the last fourteen years. The gang, or gangs, who work it have usually had their headquarters in Alsace and offices in Paris or Brussels, and in one case at least, in London. The addresses are constantly changed, and the firms have also had more than a dozen different names. References have appeared in this journal as to their activities in Great Britain, the United States, Spain, Germany, Austria, Hungary, Russia, Siberia, Chili, Sweden, Denmark, South Africa, India, Australia, and New Zealand. The victims range from small country engineers to American railway officials, and since the "Ironmonger" has spoilt their field of operations among hardwaremen, they have especially turned their attention to bailiffs of estates, country builders, and town or urban district surveyors. Quite commonly the "fake" is worked by two brothers, one of whom acts as the traveller.

Taking Orders.

Their method simply consists in bamboozling the buyer into signing an order for a very much larger amount than he supposes is the case. The precise methods of procedure depend on the estimated intelligence of the buyer; while the size of the order thus obtained varies directly with his apparent prosperity. Usually the order is taken in metric measure, and is dictated by the traveller himself, on the pretext that his firm will then understand it better. The buyer signs in good faith. The goods subsequently arrive, excessive in quantity and usually inferior in quality. The buyer protests, the sellers bully and threaten legal proceedings, but are willing to compromise for a "discount," to which the buyer, as a rule, agrees. In one such case they offered 20 per cent. discount, and eventually 50 per cent., which the buyer accepted; and in another instance they took £8 14s. out of Court to compromise a claim for £50. They very seldom fight the matter legally; and we know of cases where they have taken back the goods and paid all costs rather than appear in Court. Two law cases of which we have knowledge were reported in our issues of Oct. 28, 1899, and July 29, 1911. In both cases the swindlers lost. A review of the activities of the gang was given in our issue for Dec. 10, 1910. The dodge is now becoming a classic, like the gold brick and Spanish prisoner plant.

The Market Harborough Case.

In our last week's issue we gave a brief report of a case in the Market Harborough County Court in which the Stellorite Company, of 60, Rue de la Victoire, Paris, sued a local builder, a monumental mason, and a brick company collectively for various amounts due for steel supplied. Plaintiffs lost their case; the Judge observing that the orders were obtained under a mistake, the effect of which made it impossible to enforce them. A member of our staff went to Market Harborough and made some special inquiries into this case, of which we are now able to give fuller particulars, which throw some light upon the business methods of the Stellorite Company.

It appears that Thomas Heyman, the traveller for Stellorite, called first upon Mr. H. G. Coales, the Town Surveyor of Market Harborough, and represented that the Borough Surveyor of Leicester had already given him an order. There seems to be a slight misunderstanding on this point, for we have the Borough Surveyor's assurance that he has not placed any orders for steel with foreign firms for some considerable time. Owing to this curious misunderstanding, and being also an old friend of his Leicester *confrère*, Mr. Coales gave the traveller a sample order.

The latter then, says our contemporary, called upon Mr. William Allsop, Thos. Hickman and Sons, and the Market Harborough Brick and Tile Company, and at each place, on the strength of Mr. Coales's order, he obtained sample orders; giving it to be understood that the cost would be only a few shillings. In the first two cases, as ill-luck would have it, he had to deal with young men who did not understand what a metre meant, and who were, therefore, liable to make mistakes in giving an order in foreign measure. In the third case, he had to deal with the Manager, Mr. J. H. Smith, who knew the meaning of the word "metre," and who ordered half a bar of Stellorite steel. So that there should be no mistake, Mr. Smith wrote in brackets on the order that a bar was about four metres. Seeing this the traveller, with considerate forethought, said that his firm, being foreigners, would not understand brackets; and Mr. Smith, therefore, re wrote the order to the traveller's dictation.

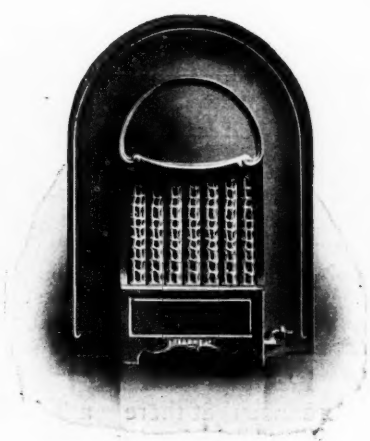
In the case of the Town Surveyor, the traveller, ever considerate, dictated the order to the office boy, as Mr. Coales was busy, and the latter signed without paying particular attention to the measurements, believing that the total amount was a few shillings. Instead of the small parcel by post which he expected, however, he received to his surprise a consignment of steel invoiced at £6, which he left in the goods yard of the railway station. He refused to accept delivery, and even went so far as to state that the order had been obtained by misrepresentation. In the other cases also more steel, by some strange coincidence, was sent than the buyers had anticipated. Unfortunately no trade card was left by the traveller giving any address to which letters cancelling the orders could be sent, and the goods arrived about a week before the invoice, though they took some ten days in transit. The buyers refused with one accord to accept delivery, and much correspondence followed.

The Company's letter paper is headed "*La Stellorite*," and contains the notice, "*Fournisseurs aux divers ministères, compagnies de chemins de fer, grandes administrations, &c.*" This means, literally, "Contractors to ministers, railway companies, great administrations, &c." It seems hardly credible that the business methods of a firm with such imposing notepaper should be called into question. The heading of the invoices is printed half in French and half in English, and under the words "The Stellorite Company" appear the names Gaulard, Heyman, and Weinberg.

The Graduated Discount System.

The Stellorite Company began very considerately to offer discounts. With Mr. Coales they went as far as 30 per cent., which he firmly refused. With Mr. Allsop they first offered 10 per cent.; and their

LONG v. SHORT RADIANTS.



The fuel in our "D.S.O." fires extends from the burner to the canopy. This type of fuel has a larger effective radiating area and gives a greater efficiency than the shorter type.

The fact that it is necessary to place extra pieces of fuel across the tops of the upright short fuel is an admission that the latter by itself does not give the maximum efficiency.

These extra pieces of fuel add to the maintenance cost.

The "D.S.O." fuel, besides being the most efficient, is therefore also the most economical.

R. & A. MAIN, LIMITED.

WORKS: Gothic Works, EDMONTON, N.; Gothic Ironworks, FALKIRK; and Gothic Works, BIRMINGHAM.

SHOW-ROOMS AND BRANCHES: 25, Princes Street, Oxford Circus, W.; 136, Renfield Street, GLASGOW; 56, Broad Street, BIRMINGHAM; 83, Old Market Street, BRISTOL; 13, Whitworth Street West, MANCHESTER; 8, Exchange Place, Donegall Street, BELFAST; 333, Queen Street, MELBOURNE; and 12, Cunningham Lane, Pitt Street, SYDNEY, N.S.W.

sympathetic letter is worth quoting as a model of forbearance under trying circumstances:

60, *Rue de la Victoire, Paris,*
April 14, 1913.

William Allsop, Esq.,
St. Mary's Road, Market Harborough.

Dear Sir,—We are very much surprised at the contents of your letter of the 11th inst. Your order No. 181 has been executed exactly according to instructions given. It is hardly necessary for us to say that we are convinced that our representative did not mention a sum of four to five shillings, and we cannot believe that you *supposed* that a bar of special steel for repairing picks, 1½ in. *square* and about 4 *metres long at* 1s. 4d. *per lb.*, could come to four or five shillings.

We are sorry, therefore, that we cannot take the goods back; but, being desirous to be agreeable to you, and especially as regards our first transaction, we will give you a special discount of 10 per cent. for cash *by return of post*; this only to show you our goodwill, and to prevent any unnecessary trouble, as we do not favour disputes of this kind.

We note that you say you would have cancelled the order before, but that you had no address. Surely you had the name of our Company, and we are well enough known, so that a letter addressed to "Stellorite, Paris," would find us from any part of the world.

What a pity it is that the people of Market Harborough should have caused so much anxiety to this well-known firm, who are so anxious to show their goodwill and prevent any unnecessary trouble, especially as they do not favour disputes of this kind. In a later letter, in which they assured Mr. Allsop at all times of their best attention, they pressed for payment, and, still later, they stated: "We employ straightforward people, and are quite convinced that they do not tell customers that a bar of steel at 1s 4d. per lb. would come to a few shillings," and they then offered the quite "exceptional discount" of 20 per cent. Receiving no reply, they very naturally threatened legal proceedings; and then, after more correspondence about discounts, Mr. Allsop asked why they only offered him 20 per cent., while other buyers were offered 30 per cent. They could not see their way to make a better offer however, and, no doubt with extreme reluctance, commenced proceedings. They also took proceedings against Hickman and Sons and the Brick and Tile Company, but, curiously enough, not against Mr. Coales, who had had the audacity to refuse their generous offer of a 30 per cent. discount to settle.

The Market Harborough Conspiracy.

Several interesting details came out at the trial. A bar of the steel was brought into Court on the shoulders of two burly labourers, and Mr. Frank Trasler cross examined Thomas Heyman, the traveller, as follows:—

How many picks and chisels would this bar point?

Witness: It depends on the man. You might use it in a month or a year.

Or twenty-five years?—Yes. [The witness here stated that he considered this was a conspiracy among the defendants. "I have come from Paris," he said, "to clear my character, because they have charged me with misrepresentation, rather than on account of the few pounds involved."] Witness also stated that "La Stellorite" was as big as Market Harborough.

John Heyman said he was a Director of the Stellorite Company, and a brother of the last witness.

His Honour: Are you two the firm?

Witness: No, my brother is only a traveller.

Witness further stated that they had never had such a case before, and they had done thousands of pounds' worth of business in England. They had had no trouble in Leicester. They had had orders from the Gas Company there, and had had repeat orders. He admitted that all the invoices were for the bar; but witness claimed that only half a bar was sent according to the order. The goods took about ten days in transit. He could not explain why the steel arrived so long before the invoices in each case. Asked why he did not sue Mr. Coales, witness said that they had a lot of transactions with urban councils, and, as the latter published a paper, it might give the Company a bad name, and do them injury with public bodies.

Considerate to the Last.

It may be added that, since the trial, Mr. Coales has received an intimation from the Stellorite Company that they are taking back the steel from the railway yard, which goes further to show how anxious they are to oblige their English customers in every possible way.

Now some people might, at first glance, be inclined to class the Stellorite Company with the Alsatian tool-steel swindlers referred to at the commencement; but we feel bound to point out that a closer examination of all the circumstances reveals a very plausible alternative explanation. It seems hard to believe that a well-known firm which shows such consideration and goodwill towards its customers should be no better than the successors of the old gang, and we, for our part, would not, without some stronger evidence, suggest any such thing. The spirit of good humour which pervades all their dealings indicates that they may have merely perpetuated a somewhat elaborate jest of which we, with our national tendency to scorn the foreign joke, fail to see the point. The strongest possible support for this explanation is afforded by the fact that the Stellorite Company sent out the consignment of steel for Market Harborough on All Fools' Day.

Portrush District Extension Order.—The Local Government Board for Ireland, having intimated to the Londonderry County Council that, as the result of the recent public inquiry, they were granting a Provisional Order for the extension of the Portrush urban district, including the townland of Glenmanus, which is in the county of Londonderry, in order that the residential district of Dhu Varren might have lighting and kindred conveniences, Mr. H. T. Barrie, M.P., a member of the Council, said he had been asked by the Rural District Council of Coleraine to oppose the Order in the House of Commons; and the County Council thereupon instructed him to act in like manner on their behalf.

The "FLAMBEAU."

Art and the

Never before have Gasfires been so closely associ-
Series, designed specially to fulfil the requirements
enthusiasm with which they are being received
endorsed by a recent letter from one of

"We consider that the adoption of Gas Heating growing in the way it should have grown in former that time, which was all we had to offer to the comfort and convenience. Fortunately, we are now growing in number—Gasfires which not only satisfy of hygiene. When it is remembered that the class are the very class who can afford to pay big gas bills (if the Gasfires put in are *modern* Gasfires), the is seen to be very strong."

We want everyone to realize that there *is* a big field with
They are not only artistic in design but you are able to
throughout, beautifully incandescent when burning,

ASK FOR OUR BEAUTIFULLY

The Richmond Gas

Gasfire

Works and General Offices:
London Offices and Show-Rooms:

SALE OF STOCKS AND SHARES.

At the Mart, Tokenhouse Yard, E.C., last Tuesday, Messrs. A. & W. Richards sold, by order of directors, executors, and others, stocks and shares in various undertakings. There were three new issues. The Tendring Hundred Water-Works Company (who also furnish gas to certain places) offered a new issue of 500 £10 "A" shares, ranking for a maximum dividend of 8 per cent., equally with the Company's existing "A" shares, the dividends on which for the last 16½ years have been at the rate of 4½ per cent. per annum. Of these shares, 295 were sold at par; the remainder being undisposed of. In the Dartford Gas Company, a new issue of £5000 of ordinary stock was all sold at from £97 to £98 per £100. This ranks for a maximum dividend of 5 per cent per annum, equally with the Company's existing capital, which has for many years received the maximum rate. The third new issue was also of £5000 of ordinary stock, by the Sutton Gas Company; and this realized from £114 to £115 per £100. It ranks for a standard dividend of 5 per cent., subject to the sliding-scale, equally with the Company's existing stock, now receiving a dividend at the rate of 6 per cent. per annum. In the Christchurch Gas Company (which is to be amalgamated with the Bournemouth Gas and Water Company as from Dec. 31 next), 227 £10 fully-paid original shares realized from £10 5s. to £10 10s. each. They rank for a maximum dividend of 10 per cent.; while the dividends for the past three years have been at the rate of 5 per cent. per annum. There were also 42 £10 fully-paid additional shares in the same Company sold at £7 each. These rank for a maximum dividend of 7 per cent.; the dividends for the last three years having been at the rate of 3½ per cent. In both cases, purchasers will take the dividend accruing from Jan. 1, 1913. Next there were offered 515 £1 fully-paid ordinary shares in the Stanford-le-Hope Gas Company, Limited (which is to be amalgamated with the Grays and Tilbury Gas Company as from Dec. 31 next); and these were all disposed of at 22s. and 22s. 6d. each. Purchasers will be entitled to the shares in the Grays and Tilbury Gas Company, to the cash payable in respect of any fractional parts, and to the full year's dividend of 5 per cent. accruing on the existing shares from Jan. 1 last. In the Enfield Gas Company (to be amalgamated with the Tottenham and Edmonton Gaslight and Coke Company from Dec. 31 next), £1434 of consolidated ordinary stock was sold at from £121 to £124 per £100. This ranks for a standard dividend of 5 per cent. per annum, subject to the sliding-scale; and the dividend for the year ended June 30 last was at the rate of 7 per cent. Purchasers take the dividend accruing from July 1, 1913.

The new issue of £5000 of consolidated stock of the Bognor Gas Company, ranking for a maximum dividend of 7 per cent., and entitled to the same dividend as is now paid on the Company's consolidated ordinary "A" stock, has been readily taken up at from £105 to £106 per £100 of stock.

A JAPANESE GAS EXHIBITION.

The number of the "Journal of the Imperial Gas Association" of Japan for the 15th ult., which is just to hand, contains the following remarks on what is stated to be a pioneer attempt in Japan to widen public interest in the gas industry by means of a special exhibition.

In contrast to Western countries, where gas exhibitions are frequently held, our country has lacked this sort of exhibition, with the one exception of that held by the Tokyo Gas Company in the Tokyo Industrial Exhibition of 1907. Needless to argue, gas exhibitions are of vital importance in promoting the existing status of the gas industry, even in a country where it is already developed to a marked degree. It is of urgent necessity, therefore, to undertake such exhibitions in our country where, though rapid strides in the establishment of the industry have been made in the last few years, the methods, both in managing and engineering, as well as the consumers' knowledge of the use of gas, are not to be mentioned on the same day with those matters in Western countries. This is why we have taken no small interest in the gas exhibition held by the Yamagata Gas Company.

As it is, the exhibition was a pioneer attempt in our local gas industry. It was held for five days, extending from the 31st of July to the 4th of August, in the building of the Municipal Office in Yamagata. The original plan was to hold the exhibition for ten days; but this was reduced to the period above referred to by some unavoidable circumstances connected with the Municipality. The exhibition was held in three halls; thus dividing all the exhibits into three main departments, corresponding to the existing number of halls. The first department consisted of coal, bye-products, meters, stoves, fittings, &c.; the second, of burners, pendants, globes, mantles, &c.; while the third was limited to all sorts of heating apparatus. Considerable variety was seen in all the exhibits; and the general arrangement was admirably devised to catch the eyes of visitors. The exhibits were, in the main, collected by the Company, with the assistance of the Ono Gas-Mantle Works, the Tokyo Gas and Electric Company, Kinmon and Co., &c., who exhibited many varieties of their own manufactures.

The exhibition was open day and night. Night opening has been rare in local exhibitions. This attempt has, therefore, not failed to attract thousands of visitors every day and night. Especially at night, overflowing crowds of visitors often necessitated the closing of the doors in order to avoid tumultuous crowding within. To what extent the exhibition has interested the people in the locality may easily be seen from this single fact. The exhibition, therefore, went a long way in promoting the existing status of the gas industry in the locality.

Our hearty congratulations are due to the officials and employees of the Company, who so admirably attempted this extensive undertaking in defiance of no small amount of difficulty and trouble, and achieved such striking success. We hope other localities will soon follow such an attempt, in order thereby to promote our gas industry in general.

Gasfire.

ated with Art as is the Richmond "PERIOD" of present day furnishing and decoration. The by Gas Undertakings throughout the country is our largest Gas Undertakings as follows:

by the best class consumer was prevented from years owing to the wretched design of Gasfires at person who placed æsthetics before consideration of able to put before such people—and they are steadily the demand of æsthetics, but also that of economy and of consumers to whom well-designed Gasfires appeal for heating . . . and never grumble at the bills case for Gasfires similar to your "PERIOD" Series

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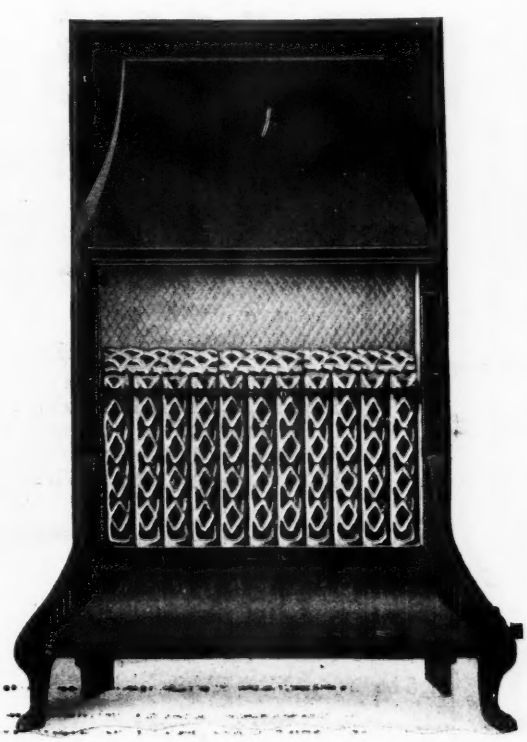

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NOTES FROM SCOTLAND.

From Our Own Correspondents.

Saturday.

The lengthy visit the Eastern Section of the Scottish Juniors paid to the Blairhall Collieries to-day was well worth while. Those attending saw a modern colliery employing about 600 hands, with a present output of about 600 tons per day. Unfortunately, the attendance was but meagre, no doubt partly accounted for by the distance most of the members had to travel, and also to the expense incurred. The latter might be defrayed by the companies and corporations who employ the Juniors, either as managers or assistants. The money so invested would no doubt yield a high rate of interest in the improved working of these employees. The first impression, and the last, of the colliery is that the whole place is very clean and up-to-date. The latter point is evidenced by the fact that all engines, except those used for winding and driving the fans for ventilation, are of the turbine type. Even one of the sets of pumps is turbine driven, while those at No. 2 and No. 3 shafts are of the three-throw order. The greatest depth is 335 fathoms —probably the deepest in Scotland. For winding there are 1500 H.P. coupled engines with automatic cut-off at the cylinders themselves to prevent overwinding of the drum, which is 20 feet in diameter. There are five boilers working at 160 lbs. pressure, with Green's economizers. Electric-driven coal-cutting machines are employed. Mr. Morrison and his staff took a great deal of trouble to show and explain everything. The Coltness Iron Company, who are the owners of the colliery, provided an excellent tea for the visitors. Mr. R B. Chalmers, of North Berwick, expressed the thanks of the Association for the courtesy, entertainment, and instruction the visitors had received. The colliery mines a very good gas coal—Lochgelly splint—and also obtains from the lower seam a navigation coal. The attendance would probably be improved at these meetings if those Seniors who are honorary members of the Association took more interest in its doings, and showed by their presence, as the honorary members do in the West, that the visits are worth attending. If they are good enough for the Seniors, they are equally so for the Juniors. It is not suggested that the Seniors should monopolize the discussions when papers are read; but they could show by their interest that the Association is a live one which should be supported by their assistants. When the Seniors are present at the discussions, their remarks might be left till the last, so that the younger men should not feel that all the "thunder" had been used, which they had hoped to make their own.

The proposal that a peripatetic gas exhibition should be formed out of the materials at the present exhibition at Shepherd's Bush has received some approval from different quarters of the country; one reason assigned being that the attendants would soon become expert in explaining the merits of the different apparatus on view, and therefore be better able to explain their advantages to the members of the general public inquiring about them. This is a most important matter, and one requiring careful training, which the average exhibition attendant does not get—in fact, it is difficult to obtain good canvassers, to call upon gas consumers, who can be relied upon to give proper advice upon the many applications of gas. Anyone who has had the experience of trying to get the average gas inspector or meter reader to take steps to make himself so acquainted with the various pieces of apparatus in the show-room as will enable him to talk intelligently to a consumer about them, will agree that the task is frequently a hopeless one. All are not, of course, so hopeless, or so careless of their future prospects; and these attend classes and study the use and advantages of each gas-using and gas-saving device. These are the men who are likely to get the better appointments. As the gas manager has realized that the day has gone when he sat in his office while the public came and implored him to supply it with gas, and that he must himself push the business against his rivals, so also must the subordinates understand that they must train themselves to be experts in the use, and in detecting the abuse, of gas. Every servant of a gas company or corporation must be a canvasser; and canvassers in these days must know their subject if they are to do any business. Much has been done recently by the trading firms in arranging lectures in regard to their manufactures for the benefit of gas employees; but many of the latter are not grounded sufficiently in first principles to enable them fully to take advantage of these lectures.

The North British Railway have not been long in finding out the merit and saving by the use of high-pressure gas for lighting, and have fixed up two installations on the Pintsch system—one at South Leith and the other at Portobello—for the illumination of their goods yards. There are two rotary compressors driven by gas-engines at Leith, each of 2400 cubic feet per hour capacity at a pressure of 60 inches of water. At present there are forty lamps, fixed 22 feet above the level of the rails, in wind and rain proof lanterns, fitted with automatic distance lighters, each lamp stated to give 750-candle power at a consumption of 13 cubic feet per hour, and many smaller lamps of 200-candle power each with a consumption of 3 cubic feet each. The Portobello scheme is not so large; there being only 21 1000-candle power lamps; and the compressor is single, and only deals with 2400 cubic feet per hour. It will be interesting to learn the saving to the Company by the use of high-pressure gas, as the new arrangement displaces ordinary burners, giving only 100-candle power each with a consumption of 24 cubic feet; so that, besides the enormous increase of light, there should be a great decrease in the gas bill.

The question of the rate at which electric current should be charged when used for compressing gas for lighting has arisen in Edinburgh. The Forth R.G.A. Drill Hall at Easter Road is lighted by sixteen 500-candle power and two 1500-candle power lamps on the high-pressure system, working at 80 inches of water; and the rotary compressor, made by Messrs. James Milne and Son, Limited, is driven by an electric motor. The rate charged was that in force for lighting; but the Commanding Officer called the Corporation Electricity Department's notice to the fact that the current was used for power, and that he expected the power rate to be charged. The Committee have, how-

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	Radiation Result.	Ratio.	Gain.
1912 Fire with 1912 Fuel	51·0	100	—
1912 „ „ 1913 Fuel	59·7	117	17
1913 „ „ 1913 Fuel	**73·1**	143	43

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ever, insisted on the higher rate, as the ultimate use of the power has been for lighting. In this way they have killed the goose that might have laid the golden eggs for them in the future, as those installing high-pressure systems will now use small gas-engines for the compressor, in place of the current by which the Committee might have retained some, at least, of the business.

Bailie Paxton, the Convenor of the Glasgow Gas Committee, is a well-known figure at gas managers' meetings in or about Glasgow, and he has given great attention to gas matters, especially as regards the commercial side of the business. His election to the position of President of the British Commercial Gas Association for the coming year is an acknowledgment of his study of the questions which the Association was instituted to consider. His remarks, or rather veiled hints, regarding Aberdeen and Dundee, for not coming into line with so many other important concerns and joining the Association, are being discussed publicly in these two cities; and it is to be hoped that the "powers that be" will, though late, decide to join issue with others who have the interest of the industry at heart. Just now the municipal mind is given over to elections, and councillors are either telling the electors what they have done, or are going to do if re-elected, or are helping their fellows to tell this to the ratepayers. Some of the statements regarding gas affairs are vague, and show that the knowledge of the average councillor who serves on a gas committee is not of a very deep character. Why should there not be classes for the instruction of councillors in the various departments they have to administer, such as gas, water, electricity, sanitation, &c., in the same way as the vacation courses for teachers?

The Glasgow Corporation Electricity Department, not to be outdone by the Gas Department, are having at the Zoo Buildings an exhibition which was opened on Thursday by the Countess of Glasgow, and is to remain open for about three weeks. The usual "wonders" of electricity in heating shaving water, boiling a kettle on the table, heating curling-tongs, and cooking and heating, are shown; but the consumption of current and the cost are not mentioned, nor is the fact that gas can do, and has done for a long time, all these things, and many more, at much less cost and equally satisfactorily. Of course, there are many exhibits of motors and plants for country-house lighting, lamps of all kinds, from the old carbon lamp to metal filaments and flame arcs, cables, wiring, fittings, switches, and many other things which will make the exhibition of interest to the general public. The latter are to be induced to come in by a continuous cinematograph entertainment, in addition to the usual band performances. Lectures are also being arranged for. A visit may well be made by a gas engineer so as to see what the "shop over the way" is doing.

Acetylene Plant Mishap in a Church.—During a harvest thanksgiving service in St. Patrick's Church, Jordanstown, near Belfast, a mishap to the acetylene gas plant led to an extinction of the lights. Lamps of various kinds were procured from neighbouring houses to enable the service to be concluded.

CURRENT SALES OF GAS PRODUCTS.

Sulphate of Ammonia. LIVERPOOL, *Oct.* 25.

During the past week the tone of the market for this article has remained quiet; but the further decline in values has not been large, and the closing quotations are £13 per ton f.o.b. Hull, £13 1s. 3d. per ton f.o.b. Liverpool, and £13 2s. 6d. per ton f.o.b. Leith. In the forward position, producers still for the most part refuse to recognize the easier situation, and consequently there has been no first-hand business recorded. Middlemen are, however, reported to be offering abroad at a premium of 2s. 6d. to 5s. per ton on prompt prices, according to period of delivery.

Nitrate of Soda.

The market for this material continues dull; but quotations are repeated at 10s. 7½d. per cwt. for ordinary and 10s. 10½d. for refined quality, on spot.

Tar Products. LONDON, *Oct.* 27.

There is nothing of particular note to report concerning the markets for tar products except pitch, in which there has been seen a reduction in the price to the extent of 1s. to 2s. per ton; and some business has been reported at several ports at the lower prices. The contracts arranged have stretched into next year as regards delivery; and there is still talk of prices being quoted at home and abroad which work out at even lower than to-day's quotations. Benzol 90 per cent. keeps firm, and the price is well maintained. Solvent and heavy naphthas are quiet; but there has been no further reduction in price. Crude carbolic is decidedly weak, and consumers report that they are being offered it for the first six months of next year at very reasonable prices. Creosote is firm, and good business has been done in this article during the past week at the equivalent of to-day's values.

The average prices during the week were: Tar, 28s. 6d. to 32s. 6d.; Pitch, London, 42s. to 43s.; east coast, 42s. to 42s. 6d.; west coast, Manchester, 41s. 6d. to 42s.; Liverpool, 42s. to 42s 6d.; Clyde, 43s. to 43s. 6d. Benzol, 90 per cent., naked, London, 1s. 1d. to 1s. 1½d.; North, 1s.; 50-90 per cent., naked, London, 1s.; North, 11d. Toluol, naked, London, 10½d. to 11d.; North, 10½d. to 11d. Crude naphtha, in bulk, London, 5½d. to 5¾d.; North, 5d. to 5¼d. Solvent naphtha, naked, London, 10¼d. to 10⅜d.; North, 9¼d. to 9⅜d. f.o.b. Heavy naphtha, naked, London, 10d. to 10¼d. f.o.b.; North, 9d. to 9¼d. f.o.b. Creosote, in bulk, London, 3⅜d. to 3½d.; North, 3d. to 2⅞d. Heavy oils, in bulk, London, 3⅝d. to 3¾d. Carbolic acid, casks included, 60 per cent., prompt, east and west coasts, 1s. 1d. to 1s. 1⅛d. Naphthalene, £4 10s. to £10; salts, 50s. to 55s., bags included. Anthracene, "A" quality, 1⅛d. to 1¼d. per unit; "B" quality, nominally ¾d. per unit, packages included and delivered.

Sulphate of Ammonia.

A dull week has been experienced in this article, and prices have

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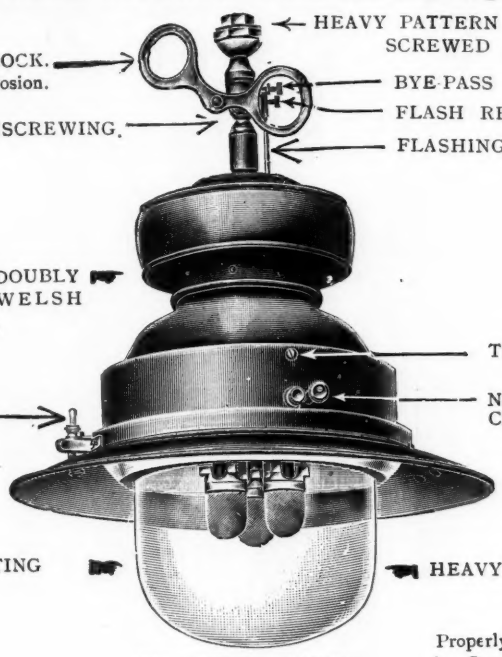
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BEST MONOPEL HEAT-RESISTING GLASS.
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again receded to the extent of 1s. 3d. to 2s. 6d. per ton at many ports. Outside London makes to-day are quoted at £12 6s. 3d.; Hull, £12 18s. 9d. to £13; Leith, £13 2s. 6d. to £13 3s. 9d; Liverpool, £13 1s. 3d. to £13 2s. 6d.; Middlesbrough, £13 to £13 1s. 3d.

Manchester District Tar Prices.

It is officially announced that the average price realized for September deliveries of tar in the Manchester district—based on the value of the products—was 35s. 6d. per ton.

"**Tar Distiller**" writes under date of the 24th inst.: The chemical market, with the exception of solvent naphtha and carbolic, is good. There is a fair demand for every other article. Pitch is firm in all positions; 44s. 9d. net having been paid east coast and afterwards 45s. refused. West coast makers are well sold, and offers which are being continuously suggested to break the firm prices ruling in Manchester and Liverpool are ignored; the stocks being small and the make well sold. The efforts of certain parties to break this market are sure to be unavailing. The prices are 45s. east coast; 44s. Manchester; 45s. Liverpool; 45s. London; carbolic acids, 60's, 1s. 1½d.; solvent naphtha, 9¾d.

COAL TRADE REPORTS.

Northern Coal Trade.

The coal trade is steady for fuel for prompt delivery; but for forward sales the prices are easier. Steam coals are weaker; the inquiry naturally showing less pressure with the passing of the Baltic season. Best Northumbrian steams are from 14s. 10d. to 15s. per ton f.o.b.; second-class steams are about 13s. per ton; and steam smalls are quiet at 6s. 9d. to 8s. The production is now heavier, but is well taken up for the next fortnight. In the gas coal trade there is activity, and generally recent prices are fully maintained. Best Durhams are 15s. 3d. to 15s. 6d. per ton f.o.b.; second-class gas coals are 14s. to 14s. 3d., and are rather firm at these figures; while for "Wear specials," from 15s. 6d. to 15s. 9d. per ton f.o.b. is the quotation. A large part of the output of gas coals generally is, however, taken up by the contracts at slightly lower prices. Among the contracts that are reported, that for Trondbjem for 8000 tons, for next year, is reported taken at about 17s. 10½d. per ton delivered; and other sales are in treaty. But prices are to a large extent ruled by the period of delivery—the present expectation being that, after the winter consumption is provided for, there may be the ease in gas coals which is already shown in steam qualities. Coke seems firmer. There is a better demand for gas coke locally. Exports appear to be steady; and for good gas coke, from 17s. 3d. to 17s. 7d. per ton is quoted f.o.b. in the Tyne.

Scotch Coal Trade.

A more or less easier feeling pervades some departments of the coal trade in Scotland. Prices are, however, keeping up well; and the general position is regarded as satisfactory. On the Glasgow Coal Exchange on Friday, the following were the prices quoted: Ell coal, best brands, 13s.; splint, 13s. to 15s. 6d.; Hartleys, 15s. 6d.; Navigations, 15s. to 17s.; steams, 13s. to 14s. 6d.; trebles, 13s. 6d. to 13s. 9d.; doubles, 12s. 3d. to 12s. 6d.; singles, 11s.; pearls, 9s.; dross, 8s.—f.o.b. Glasgow.

The New Vertical Retorts at Nottingham.

In connection with the formal opening of the new Glover-West vertical retorts at the Radford works of the Nottingham Corporation next Friday, invitations have been issued by the Chairman (Alderman A. Ball, J.P.) and the members of the Gas Committee to their colleagues in the Council to a luncheon at the Exchange Hall, to follow the ceremony. Preparations have for some time past been in progress for bringing the new retorts into actual use coincidently with the inauguration. As far as preliminary observations have afforded any ground upon which to base a judgment, the Corporation will have adequate cause for satisfaction in relation to the new venture, both upon the score of engineering details and the economic possibilities which the plant presents. The authorities have been particularly fortunate in the possession of such a centre as that at Radford where the new retorts could be conveniently installed without affecting in any way existing operations. No decision has yet been arrived at as to the commencement of the other half of the work; but it is understood that the extensions may be entered upon as soon as sufficient particulars are available regarding the results of the working of the first half of the plant, the contract for which was £26,000.

Gas for Power at West Bromwich.—At a municipal election meeting at West Bromwich, Mr. C. S. Bache (the Mayor-Elect), who is seeking re-election, was questioned by his opponent, Mr. J. Holland, concerning the gas undertaking. Mr. Holland asked if it was true that the people who were using gas for motive power were getting it at less than cost price. Mr. Bache observed that the Gas Committee stated they were not selling gas for motive power below cost price. Mr. Holland said when he was a member of the Gas Committee he asked the question; and the late Mr. Hudson (Borough Treasurer) told him distinctly that it cost 2s. 1½d. to produce 1000 feet of gas; and consumers were getting gas to-day for motive power for 1s. 4d. Mr. Bache replied that since he had been on the Council they had re-constructed the gas-works, with the result that they could now produce gas very much more cheaply. When Mr. Hudson gave Mr. Holland those figures, no doubt he was right; but he would not be correct in his statement to-day.

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Aberdeen and Dundee and the British Commercial Gas Association.

Under the heading of "Aberdeen's Gas Aloofness," the following remarks were made in the "Aberdeen Weekly" last Saturday: "A frequent complaint heard from time to time among the gas experts who are crowding London just now has been the aloofness of Aberdeen from the British Commercial Gas Association. I think Wednesday was the first occasion on which a speaker gave vent to his annoyance on this point in public. Bailie Paxton, the Convener of the Glasgow Gas Committee, who has just been made President of the Association, made veiled hints at both Aberdeen and Dundee. These are practically the only two big municipal undertakings not within the Association. Bailie Paxton at a luncheon on Wednesday urged that they ought to become allied, as they were already getting the benefit of the Association's activities. Not once did he mention either of these northern towns; but his audience—all of them men connected with the industry—at once assumed that these were the two Corporations to which he was referring. He did not try to disguise it, for in private conversation afterwards he admitted that this was what he had in mind. The attitude of Aberdeen is a very sore point with the Association, which prides itself on having among its members all the best brains in the industry. The resentment is increased rather than diminished by the fact that they recognize Aberdeen's gas authority to be enterprising."

Mr. Henry O'Connor on the Advantages of Gas.—The healthiness, cleanliness, and economy of gas were brought forward most efficiently in the Board-room of the Portsea Island Gas Company on Monday last week, in a lecture by Mr. Henry O'Connor, Assoc.M.Inst.C.E., F.R.S. (Edin.). The audience included local doctors, architects, and the leading builders in Portsmouth. Mr. R. E. Hellyer, the Chairman of the Company, presided. The lecturer explained, by means of diagrams, the most approved modern methods of lighting, heating, and cooking, and stated that in London alone 350,000 gas-fires were in use during the winter season.

Gas Explosion at Ashton-under-Lyne.—Injury to a number of people, and great damage to property, were caused by a gas explosion at Ashton-under-Lyne on Saturday night. Fire followed the explosion, and five small houses were rendered uninhabitable. It seems that on Friday several of the residents complained of a strong smell of gas; and the Gas Company were notified. At the time of the accident, a gang of the Company's men were engaged on the street-main, and had warned the residents of the cottages not on any account to light the gas-jets. Some persons who sustained minor injuries were passing along the street at the time, and were struck by flying *débris*. An employee of the Gas Company had an ankle fractured, and Mrs. Clayton, the wife of a tenant of one of the cottages, is suffering from a broken leg. The other injuries consisted of burns and cuts. Altogether, nine persons were hurt.

Dangers of Electricity.

Referring to the account of the explosion in a manhole at the end of Norfolk Street, Strand, on the 19th inst., which was given in the "JOURNAL" last week (p. 245), a correspondent who was staying at a large hotel near the scene informs us that a fire broke out at the offices of the Law Land Company, and that in a few minutes four engines were on the spot. Several loud explosions took place at the electric cable boxes, and flames were seen on both sides of the street. The uncomfortable feature of the affair in our correspondent's case was that the electric lights in his hotel were shut off, and from 6.30 p.m. something like 30 or 40 candles were in use for the rest of the evening. The fire was speedily extinguished; but our correspondent and the other residents were all in the dark. Fortunately no personal injuries were sustained. This was unhappily not the case in a serious explosion which occurred in the electric power house on Staten Island last Wednesday; six persons being killed and two mortally injured. According to a Central News telegram, the explosion resulted in the whole of that district of New York being plunged into darkness, and traffic on the electric tramways and railways was brought to a standstill owing to the failure of the current. On the same day, a dozen girls employed by the British and Colonial Cinematograph Company, of Endell Street, Long Acre, had a very narrow escape from a fire by rushing downstairs from the fifth floor of the building. Owing to the fusing of an electric wire, some negatives caught fire on the top floor of the film warehouse, and damage was done estimated at £50,000.

Gas v. Steam for Pumping Water.—According to a report made by Mr. Percy Griffith, M.Inst.C.E., to the Sudbury Town Council, a substantial saving can be realized at their water-works by replacing the steam pumping plant by gas-engines and suction producers; and this course has been decided upon. The cost of engines and producers in duplicate, with new pump and gears and other expenses, is estimated at £1200—an annual saving in fuel and maintenance of £170 being anticipated. Deducting £104 for interest and repayments on a loan for fifteen years, there is a net saving of £66 per annum, which will be increased to £170 when the loan has been paid off.

Sedgley Gas-Works Extensions.—The Gas Committee, reported at the monthly meeting of the Sedgley Urban District Council, that they had instructed the Secretary to write to the contractors carrying out the works extension scheme urging them to complete the undertaking within the stipulated time. Mr. Tennant remarked that the task of dismantling the old gas-works, building the new works, and at the same time maintaining the supply to consumers, had proved a difficult one. Owing to a blunder, the fires under a bed of old retorts, which were intended to provide for an emergency, had been let out; and this had been the principal cause of the deficiency during the last three weeks. They were getting over their difficulties; and a new bed of retorts would shortly be at work.

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Water Supply in Belgium.

We learn from a recent issue of the Engineering Supplement to "The Times" that the scheme suggested by the Belgian Government for establishing a Société Nationale des Distributions d'Eau, to inquire into the needs of the different communes, to investigate the available sources of supply, and to carry out the works required in each case, has been approved by the Chambers. The capital is to be provided by the State, the provinces, and the communes interested. This measure will give a stimulus to the establishment of water-supply plants in Belgium, where scarcely one-tenth of the 2600 communes have works for providing drinking water, and the existing plants are in most cases independent of each other. A scheme has been suggested for supplying a number of localities in the neighbourhood of Liège with water taken from the Neblon springs, situated near Ouffet, on the borders of Liège and Luxemburg. The average yield is about 7¾ million gallons a day; and the minimum has been determined as 2¾ million gallons per 24 hours. The total expenditure involved by the scheme is estimated at £200,000, of which a sum of £5200 is for the collecting works. As a step towards the utilization of the water from the underground reservoir, extending over about 160,000 acres, discovered in Campine, in the district of Moll, an intercommunal company (representing 34 communes, with a population of somewhere about 325,000 inhabitants) has been formed.

Fatal Injuries by a Charging-Machine.

On Saturday, the 18th inst., James Hawkes (58), a machine man at the Bradford Road Gas-Works of the Manchester Corporation, was fatally injured through the sudden starting of a charging-machine; and an inquiry into the matter was held on the following Monday by Mr. A. E. Gibson, the Manchester City Coroner. Mrs. Hawkes said her husband had been in the employ of the Corporation for 37 years, and was a very steady man. He had never complained about the machine being out of order. John Edmondson, foreman mechanic at the works, said the machine was worked by compressed air, and he had never known it to start when the lever was actually in its clutch. His opinion was that when the machine was previously stopped the lever had not been dropped properly into the notch, and that the vibration had caused it to move, with the result that the machine commenced running. William Anderson, a machine attendant, said the machine had only been stationary about a couple of seconds when it started. Along with Hawkes, who had charge of the machine, he was in danger of being caught, but managed to jump clear. Hawkes, however, was trapped, and was badly injured about the lower part of the body. Witness and other workmen said the lever was in perfect order, and that it was impossible to release it with vibration when it was fixed properly in the clutch. A verdict of "Accidental death" was returned.

Glover-West Verticals for Nelson.

At a special meeting of the Nelson Town Council on Tuesday last, the following recommendation of the Gas Committee came up for consideration: "That application be made to the Local Government Board for sanction to borrow the sum of £26,000 for the erection of a new retort-house, an installation of Glover-West vertical retorts, erection of retaining wall, &c., at the Brierfield Gas-Works; and that the tender of West's Gas Improvement Company, Limited, of Manchester, be accepted for the installation, subject to details being arranged to the satisfaction of the Gas Engineer" (Mr. A. Morton Fyffe). The Chairman of the Committee stated that the extension was needed because of the abnormal increase in the consumption of gas. When they replaced the old retorts in Nelson with vertical ones, they had a margin of 24 per cent.; but about 19 per cent. of this margin had already been lost by the increase in the consumption. The new plant at Brierfield would give them a 33 per cent. margin. This would perhaps cover five or six years' requirements. The scheme covered three installations similar to the one they were now proposing to lay down. One reason for placing the plant at Brierfield was that the present purifying plant at Nelson was at its maximum, and they had a margin in their purifying plant at Brierfield. The recommendation was approved.

Price of Gas in Dublin.—A correspondent of the "Irish Times," discussing the high price of gas in Dublin and the proposed increase, points out that a reduction has taken place in Warrington and probably in other English towns. He argues that there should be a reduction in the number of employees of the Alliance and Dublin Gas Company; mentioning that, in regard to installations for both lighting and cooking, "three sets of men are sent before the work is finished."

Consolidated Gas Company of Baltimore.—In the annual report of the Consolidated Gas, Electric Light, and Power Company of Baltimore for the year ended the 30th of June, it is stated that the results of the operations of the gas and electric divisions were as follow: Gross income $6,114,973; operating expenses and taxes, $2,963,181; net earnings, $3,151,792; fixed charges, $1,476,767; net income, $1,675,025; dividends paid and payable, $810,673; surplus, $864,352; reserve for depreciation, amortization, &c., $460,000; special reserve for new business campaign and extraordinary expenses, $300,000; net surplus, $104,352. A comparison of the gross income with the previous year shows an increase of $649,686, or 11·9 per cent.; and the net earnings an increase of $329,393, or 11·6 per cent. Expenditures during the year for extensions, improvements, and betterments completed and in course of completion were: Gas division, $713,433; electric division, $620,213. The condition of the gas and electric plants and distribution systems was fully maintained by the expenditure for ordinary repairs and maintenance of $325,056. The gross income from the sale of gas was $3,260,955, or an increase of $211,510; and from the sale of electricity, $2,801,995—an increase of $420,872.

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Projected Extension of the Wokingham Gas-Works.—At a meeting of the Wokingham Town Council last Thursday, a resolution was adopted that application should be made to the Local Government Board for a Provisional Order to authorize the utilization of further land for the manufacture and storage of gas and residual products, and the borrowing of more money for the general purposes of the gas undertaking. It was stated that there was nearly three times as much gas used now as in 1900, and that the price had been reduced from 5s. to 3s. per 1000 cubic feet.

Fatality at the Dublin Reservoir Works.—A blacksmith named Thomas Dwyer met his death as a result of falling from a height of 46 feet into a trench at the new reservoir in connection with the waterworks of the Dublin Corporation at Roundwood. He was found to have suffered from fractured skull and arms and deep flesh wounds; but a Coroner's Jury declared, on medical testimony, that death was due to pneumonia, following shock and exposure. The accident occurred late at night, and Dwyer was not discovered until the following day. He did not recover consciousness. It is believed he missed a footbridge crossing the cavity while going to the workmen's huts.

Rewards for Bravery.—The Committee of the Royal Humane Society last Thursday week issued a list of awards for bravery; among them being a number of Yorkshire cases. In connection with the fatality which took place at the Leeds Corporation gasholder at Lower Wortley on the 12th of August, when, as recorded in the "JOURNAL" at the time, two men were suffocated by coal gas, bronze medals were awarded to Thomas Barlow, Christopher Bywater, Herbert Briggs, Thomas Vinters, Oscar Ellis, Police-sergeant John Horn, and Constables Charles Spirrett and John Taylor, for their exertions in saving, or attempting to save, life under the most difficult and dangerous conditions; an "In memoriam" being given to the relatives of Patrick Carry, who lost his life in gallantly trying to save a fellow-workman.

Lamps Overhanging Public Thoroughfares.—Under section 164 of the London Building Act, 1894, the London County Council are empowered to make bye-laws for the regulation of lamps, signs, or other structures overhanging the public way not being within the City of London, and provision is made for such bye-laws to be administered by the local authority. The Building Acts Committee of the Council have for a considerable time been engaged in the preparation of such bye-laws as would meet, as far as possible, the divergent views of the various interests concerned, and have been in communication informally with the Local Government Board thereon; and at the meeting of the Council to-day they will submit a set of bye-laws for approval.

Suggested Joint Water Supply for North Cornwall.—The Bodmin Rural District Council have decided to invite the Camelford Rural District Council to consider the question of the provision of a joint water scheme for their districts. Mr. W. Button, who brought the matter forward, expressed the opinion that it would be much cheaper and better to have one scheme for a large area than a number of small and probably ineffective undertakings for separate villages. A supply could be drawn from a high level which would serve the whole district by gravitation. The cost would be roughly £8500, and this would work out at about 3d. per 1000 gallons. Indirectly it would be a great advantage, because visitors would come in larger numbers if they knew the water supply was pure and abundant.

We have received from Messrs. J. & W. B. Smith, of Farringdon Road, E.C., a copy of their new general catalogue of gas-fittings. The printing is in a pleasing shade of brown, and the book is profusely illustrated. One of the features is a section devoted to bead shades, in which about fifty different patterns of these popular decorative articles are in the colours in which they are supplied.

GAS COMPANIES' STOCK AND SHARE LIST.

Things on the Stock Exchange last week were really not quite as bad as the two preceding weeks—that is to say, it was not a period of unadulterated gloom, but had a fair mixture of light and shade. Political troubles at home and abroad, and labour unrest, continued to cause apprehension, while Railways took fright at the prospect of the Government Commission. But they viewed it more calmly before the close of the week; and this, coupled with the abatement of apprehension of a 6 per cent. Bank rate, infused more heart into markets. Business on the opening day was of the quietest; but the general tone was rather better except in Government stocks, where Balkan affairs and the incubus of competing issues were deterrent. Rails made some little recovery, and Transatlantics improved. Tuesday emphasized the improvement, both in tone and in activity. A reaction from the recent selling set in, and buying back was in evidence. Gilt-edged were firm, Rails were brisk and scored some fair advances, while Transatlantics were active and buoyant. Markets on Wednesday opened under the same cheery influence; but it was not strong enough to last. Buying ceased; and a renewal of sales by Foreign Exchanges took the cream off some rises in price and obliterated others altogether. Consols held on tight, and Rails scraped through with some slight falls, while Americans were rather ragged and uneven. Thursday was languid and depressed, and all markets were dull; Transatlantic operations setting the tone. Consols were ⅛ easier for the account, and Rails fell from sheer inanition. Friday also was a flat day, and prices in most markets crumbled away. Government issues of all sorts were weaker; and Rails were undermined by the announcement of a Royal Commission with all its possibilities of mischief and spoliation. Americans drifted hither and thither, as the wind veered from quarter to quarter. Saturday was better, but not for all departments. Consols fell ⅛ for money; but Rails plucked up courage considerably, and Americans were firmer. Consols closed at 72⅜ to 72⅝—a fall of ⅛ in the week. The Money Market was generally steady throughout the week. Business in the Gas Market was colourless and uninteresting. The aggregate of transaction was below the average, and the greater part of that was confined to the two largest issues; while, in point of quotation, in the London Market only one was varied. In Gaslight and Coke issues, the ordinary was active enough and quite firm. Two or three bargains were let go at 100¾; but all the rest were at 101-101¾. In the secured issues, the maximum realized 74⅜ to 76¼, the preference 93 and 93¾, and the debenture 73 to 73¾. South Metropolitan was much more active, changing hands at 108 to 109½; and the debenture made 73¼ and 73½. Nothing at all was done in Commercials. In the Suburban and Provincial group, Alliance and Dublin was done at 61½, Bournemouth preference at 13 9/16, Brentford new at 202 and 202½, British at 44⅞, and South Suburban at 117. On the local Exchange, Liverpool "A" was done at 206¼, ditto "B" at 149, and ditto debenture at 94—a fall of 2. In the Continental companies, Imperial realized 165½ to 166½, ditto debenture 85 and 85⅜, Union 79⅝ to 80½, and European 17⅝ to 18. Among the undertakings of the remoter world, Primitiva fetched 5 15/16 to 6⅛, ditto preference 4⅞ to 4 13/32, and ditto debenture 93½.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
1,551,868	Stk.	Oct. 15	4	Alliance & Dublin Ord.	58—63*	..	6 7 0
374,000	,,	July 11	4	Do. 4 p.c. Deb.	80—83	..	4 16 5
280,000	5	Oct. 15	7½	Bombay, Ltd.	6¼—6⅜*	..	5 17 8
50,000	10	Aug. 28	15	Bournemouth Gas & Water } 10 p.c.	28½—29½	..	5 2 2
347,500	10	,,	7	B 7 p.c.	14⅜—15½	..	4 11 10
75,000	10	,,	6	Pref. 6 p.c.	13½—19⅜	..	4 7 3
880,000	Stk.	Aug. 14	14	Brentford Consolidated	262—267	..	5 4 10
330,000	,,	,,	11	Do. New	198—203	..	5 8 5
50,000	,,	,,	5	Do. 5 p.c. Pref.	111—113	..	4 8 6
206,250	,,	June 13	4	Do. 4 p.c. Deb.	94—96	..	4 3 4
217,380	Stk.	Aug. 28	11	Brighton & Hove Orig.	201—206	..	5 6 10
244,200	,,	,,	8	Do. A Ord. Stk.	148—151	..	5 6 0
530,000	20	Sept. 26	12½	British	44½—45½	..	5 9 11
120,000	Stk.	June 27	4	Do. 4 p.c. Deb. Stk.	87—89	..	4 9 11
245,771	Stk.	,,	4	Buenos Ayres 4 p.c. Deb.	89½—91½	..	4 7 5
100,000	10	—	—	Cape Town & Dis., Ltd.	8—8	..	—
100,000	10	—	—	Do. 4½ p.c. Pref.	3—5	..	—
100,000	Stk.	June 27	4½	Do. 4½ p.c. Deb. Stk.	75—80	..	5 12 6
157,150	Stk.	Aug. 14	5	Chester 5 p.c. Ord.	108—109	+½	4 11 9
1,513,280	Stk.	Aug. 28	5/9/4	Commercial 4 p.c. Stk.	105—107	..	5 2 1
560,000	,,	,,	5½	Do. 3½ p.c. do.	102—104	..	5 2 6
475,000	,,	June 13	3	Do. 3 p.c. Deb. Stk.	71½—73½	..	4 1 8
800,000	Stk.	,,	4	Continental Union, Ltd.	75—82	−1	4 17 7
200,000	,,	,,	7	Do. 7 p.c. Pref.	124—126	..	5 11 1
492,270	Stk.	—	5	Derby Con. Stk.	103—124	..	4 0 8
55,000	,,	—	4	Do. Deb. Stk.	102—104	..	3 16 11
1,002,180	10	July 30	10	European, Ltd.	17½—18½	..	5 8 1
16,386,660	Stk.	Aug. 14	4/17/4	Gaslight and Coke } 4 p.c. Ord.	100—102	..	4 15 7
2,600,000	,,	,,	3½	3½ p.c. max.	74—77	..	4 10 11
4,062,235	,,	,,	4	4 p.c. Con. Pref.	93—96	..	4 3 4
4,674,850	,,	June 13	3	Coke } 3 p.c. Con. Deb.	72—74	..	4 1 1
258,740	Stk.	Sept. 11	5	Hastings & St. L. 3½ p.c.	87—89	..	5 12 4
82,500	,,	,,	6½	Do. do. 5 p.c.	—	..	—
70,000	10	Oct. 15	11	Hongkong & China, Ltd.	163—171*	..	6 7 6
131,000	Stk.	Sept. 11	7⅞	Ilford A and C	150—153	..	4 19 8
65,780	,,	,,	6⅛	Do. B	118—120	..	5 2 1
65,500	,,	June 27	4	Do. 4 p.c. Deb.	89—91	..	4 7 11
4,940,060	Stk.	May 16	9	Imperial Continental	163—168	..	5 7 2
1,235,000	Stk.	Aug. 14	3½	Do. 3½ p.c. Deb. Red.	83½—85½	..	4 1 10
900,342	Stk.	Aug 28	6½	Lea Bridge Ord. 5 p.c.	118—121	..	5 3 4
561,000	Stk.	,,	10	Liverpool United A	206—208	..	4 16 2
718,100	,,	,,	7	Do. B	143—150	..	4 13 4
306,083	,,	June 27	4	Do. Deb. Stk.	94—96	−2	4 3 4
63,480	Stk.	June 27	3	Maidstone 3 p.c. Deb.	66½—68½	..	4 7 7
£			p.c.				£ s. d.
75,000	5	June 13	6	Malta & Mediterranean	4⅜—4⅞	..	6 3 1
250,000	100	Oct. 1	4½	Met. of Melbourne } 4½ p.c. Deb.	96—98	..	4 11 10
541,930	20	May 30	4	Monte Video, Ltd.	12—12½	..	6 8 0
1,775,892	Stk.	July 30	4½	Newc'tle&G'tesh'd Con.	99½—100	..	4 10 0
529,705	Stk.	June 27	3½	Do. 3½ p.c. Deb.	83½—84½	..	4 2 10
55,940	10	Aug. 28	7/10/6	North Middlesex 7 p.c.	12½—13½	..	5 11 5
300,000	Stk.	May 16	8	Oriental, Ltd.	124—129	..	6 4 0
60,000	5	Sept. 26	10	Ottoman, Ltd.	8—8½	..	5 17 8
60,000	50	Aug. 14	13	Portsea, Island B	122—125	..	5 6 1
100,000	50	,,	12	Do. C	119—122	..	4 18 4
249,980	5	Oct. 15	8	Primitiva Ord.	5⅞—6⅝*	..	6 5 6
499,960	5	June 27	5	,, 5 p.c. Pref.	4¼—5⅛	..	4 17 7
521,600	100	June 2	4	,, 4 p.c. Deb.	93—95	..	4 4 3
346,198	Stk.	June 27	4	River Plate 4 p.c. Deb.	89—91	..	4 7 11
275,000	5	Sept. 26	12	San Paulo, Ltd.	—	..	—
150,000	10	,,	6	Do. 6 p.c. Pref.	11—11½	..	5 4 4
125,000	50	July 1	5	Do. 5 p.c. Deb.	49—51	..	4 18 0
135,000	Stk.	Aug. 28	10	Sheffield A	222—224	..	4 9 3
209,984	,,	,,	10	Do. B	222—224	..	4 9 3
523,500	,,	,,	10	Do. C	220—223	..	4 9 8
90,000	10	Oct. 15	7½	South African	9½—10⅜*	..	7 2 10
6,429,895	Stk.	Aug. 14	5/9/4	South Met., 4 p.c. Ord.	108—110	..	4 19 4
1,895,445	,,	July 11	3	Do. 3 p.c. Deb.	73—75	..	4 0 0
209,820	Stk.	Aug. 14	8½	South Shields Con. Stk.	157—159	..	5 6 11
952,795	Stk.	,,	6	S'th Suburb'n Ord. 5 p.c.	115—117	..	5 2 7
60,000	,,	,,	5	Do. 5 p.c. Pref.	113—115	..	4 6 11
117,058	,,	June 27	5	Do. 5 p.c. Deb. Stk.	115—117	..	4 5 6
594,740	Stk.	May 16	5	Southampton Ord.	102—105	..	4 15 3
120,000	Stk.	Aug. 14	7⅜	Tottenham and Edmonton } A 5 p.c.	136—139	..	5 6 1
543,940	,,	,,	5⅝	B 3½ p.c.	114—116	..	5 1 3
149,470	,,	June 27	4	4 p.c. Deb.	90—92	..	4 7 0
182,380	10	,,	5	Tuscan, Ltd.	5—6	..	8 6 8
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	96—98	..	5 2 0
236,476	Stk.	Aug. 14	5	Tynemouth, 5 p.c. max.	111—113	..	4 8 6
30,000	Stk.	Aug. 28	8⅜	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	155—160	..	5 4 8
255,636	,,	,,	6¾	,, B 3½ p.c.	130—135	..	5 1 10
108,075	,,	,,	5/17/3	,, C 3½ p.c.	110—115	..	5 2 0
852,000	,,	,,	6⅛	Wimbledon 5 p.c.	111—116	..	5 5 7
£8 000	,,	,,	6⅜	Epsom 5 p.c.	115—120	..	5 10 5
88,416	,,	June 27	3	3 p.c. Deb. Stk.	68—70	..	4 5 9

Prices marked * are "Ex-Div."

The Burnley Corporation have decided to grant a week's holiday, with pay, to all Corporation workmen. Each Committee is left to deal with its own department. The decision has given much satisfaction to the employees in the Gas Department.

The Swinton and Mexborough Joint Gas Board have decided to reduce the price of gas used for lighting by 2d. per 1000 cubic feet where more than 100,000 cubic feet per annum are used. These new charges will come into force after the 31st inst.

At a meeting of the Tyldesley District Council last week, it was resolved that a scheme for the hire-purchase of gas appliances should be inaugurated. A sub-Committee was appointed to draw up and submit regulations regarding this development of the undertaking.

The Bradford Corporation Gas Committee have passed a resolution for the purchase of a new exhauster and steam-engine, at a cost of £213, in connection with the high-pressure scheme of distribution of gas between the various works, and have decided to lay mains to join the existing pipes at an estimated cost of £820.

On the occasion of the visit of Her Majesty Queen Alexandra, accompanied by the King and Queen of Norway and Princess Victoria, to the Ideal Home Exhibition on Monday last week, the first exhibits to attract the notice of the Royal party were on the stand of the South Metropolitan Gas Company, which was described and illustrated in the "JOURNAL" for the 14th inst. According to the "Daily Mail," they were a gas-driven fan and a switch attachment for gas-lights.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

ENGINEER AND GENERAL MANAGER. Chichester Gas Company. Applications by Nov. 17.
ASSISTANT TO ENGINEER. No. 5798. Applications by Oct. 31.
RENTAL CLERK. Maidstone Gas Company. Applications by Nov. 4.
WORKING MANAGER. Market Drayton Gas Company. Applications by Oct. 29.
DISTRICT INSPECTOR. No. 5803.
TRAVELLERS. Martin Engineering Company.
CHIEF FOREMAN. Birmingham Gas Department.
FOREMAN. No. 5799.
SHOW-ROOMS SALESMAN. No. 5803.

Appointments, &c., Wanted.

MANAGER OR BUYER (Lighting and Glass Goods). No. 5802.

Agency Wanted.

COAL AND PIPES. No. 5797.

Plant, &c. (Second Hand), for Sale.

GASHOLDER AND TANK, &c. Luton Gas-Works.
RETORTS AND MOUTHPIECES. Newcastle-on-Tyne Gas Company.
STATION METERS AND GOVERNORS. No. 5801.

Plant, &c. (Second Hand), Wanted.

CONDENSERS, SCRUBBERS, AND WASHERS. F. M. Paternoster, Felixstowe.
EXHAUSTER. No. 5804.
GASHOLDER. Imperial College of Science and Technology, South Kensington.
TEST ROOM GASHOLDER. No. 5805.

Stocks and Shares, Sales of.

ALDERSHOT GAS, &C., COMPANY. London Mart. Nov. 18.
BOGNOR WATER COMPANY. London Mart. Nov. 18.
BRENTWOOD GAS COMPANY. London Mart. Nov. 4.
BRIXHAM GAS COMPANY. Town Hall, Brixham. Nov. 13.
CHESTER WATER COMPANY. By Tender. Nov. 15.

Stocks and Shares, Sales of *(continued)*—

LITTLEHAMPTON GAS COMPANY. 25, High Street, Littlehampton. Nov. 5.
PINNER GAS COMPANY. London Mart. Nov. 18.
REDDITCH GAS COMPANY. Grand Hotel, Birmingham. Oct 30.
ROMFORD GAS AND COKE COMPANY. London Mart. Nov. 4.
SOUTHGATE AND DISTRICT GAS COMPANY. London Mart. Nov. 4.
TITCHFIELD GAS COMPANY. London Mart. Nov. 18.
WANDSWORTH &C., GAS COMPANY. London Mart. Nov. 25.
WEST SURREY WATER COMPANY. London Mart. Nov. 4.
WEST SURREY WATER COMPANY. By Tender. Nov. 13.

TENDERS FOR

Fire Clay Goods.

SHEFFIELD GAS COMPANY. Tenders by Nov. 4.

Purifier Boxes.

SHEFFIELD GAS COMPANY. Tenders by Nov. 4.

NOTICES TO CORRESPONDENTS, ADVERTISERS AND SUBSCRIBERS.

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